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Water Diplomacy

Establishing an Analytical Framework for Water Diplomacy
with Case Studies from Central Asia and Iraq

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Abstract

Water-related tensions are expected to increase globally due to intensifying water scarcity, ecosystem degradation, population growth and the related soaring water demand and climate change. Water diplomacy can complement existing water cooperation activities through its focus on politics and utilization of diplomatic negotiation tools, facilitating peaceful solutions to conflicts over shared waters.

Recent studies have used past water interactions, geographic and socio-economic data as well as megatrend analyses to assess future hydro-political risk on a global scale. This analysis develops a framework for a finer scale i.e. regional and national water diplomacy analysis, and tests it in two case study regions: Central Asia and Iraq. The analysis is based on relevant parts of the report "Vesi-diplomatia - ennakoivaa rauhanvälitystoimintaa" (Water Diplomacy - Proactive Peace Mediation), which was commissioned by the Ministry for Foreign Affairs of Finland and completed in March 2019.

The analytical framework is established using basic analysis and scenario techniques and focusing on the potential to create linkages between water cooperation and diplomatic tools through negotiations, conflict resolution mechanisms and joint fact-finding missions.

Methodologically, the main result of the study is the establishment and testing of an analytical framework for water diplomacy, which includes three steps: i) analysis of current state, ii) recognition of two potential Conflict Paths (based on a basic megatrend analysis and a simplified scenario process), and iii) possible water diplomacy actions to complement existing water governance arrangements. The two potential Conflict Paths were created until 2030, with one path focusing on water as a key source of conflict and other on geopolitical tensions extending also to water resources management.

Context-specific results from the case studies highlight the potential and limitations of water diplomacy efforts to prevent and mediate water-related conflicts in Central Asia and Iraq. In Central Asia, for example, there is a clear need to renew outdated regional water treaties but a lack of trust between actors has hindered progress. As such, the study complements recent global analyses on hydro-political tensions as well as regional analyses on transboundary cooperation and conflict in the case study regions.

The study highlights the multifaceted nature of water cooperation, complementing it with a water diplomacy view. The results indicate the potential for more thorough use of water diplomacy tools such as mediation and arbitration to complement on-going cooperation and governance activities. Water diplomacy can also be the most feasible way forward in heavily politicized contexts such as Iraq, paving way for long-term water cooperation. Further focus should be put on developing the analytical framework by utilising more detailed quantitative analyses as well as interviews and workshops with local experts.

Keywords Water Diplomacy, Water Cooperation, Conflict Paths, Central Asia, Iraq

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Valtioiden välisten veteen liittyvien jännitteiden arvioidaan yleistyneen ilmastonmuutoksen, väestönkasvun ja kasvavan veden niukkuuden johdosta. Vesidiplomatian tavoitteena on hyödyntää diplomaatiatyökaluja vesivaroihin liittyvien konfliktien ennaltaehkäisyssä ja sovittelussa. Vesidiplomati voi myös täydentää olemassa olevia veteen liittyviä yhteistyömekanismeja.

Useat viimeaiset tutkimukset ovat käytäneet menneitä veteen liittyviä tapahtumia, maantieteellistä ja yhteiskunnallista tietoa sekä megatrendianalyyssejä tulevaisuuden vesikonfliktiriskien kartoituksessa globaalilla tasolla. Tämän analyysin tavoitteena on kehittää viitekehys tarkemalle vesidiplomati-analyysille esimerkiksi alueelliselle tai kansalliselle tasolle ja arvioida sen toimivuutta kahdella tapaustutkimuksella, joiden kohteet ovat Keski-Aasia ja Irak. Analyysi perustuu Suomen ulkoministeriön tilaamaan "Vesidiplomati - ennakoivaa rauhanvälitystoimintaa" tilaustutkimukseen, joka valmistui maaliskuussa 2019.

Vesidiplomatian analyttinen kehys muodostetaan käyttämällä yksinkertaisia analyysi- ja skenariomenetelmiä ja keskittymällä kytkösten muodostamiseen vesivarayhteistyön ja diplomatian välille erilaisten diplomatiatyökalujen (esimerkiksi neuvottelut, konfliktien ratkaisumekanismit ja yhteiset tiedonkeruumatkat) avulla.

Tutkimuksen menetelmällinen tulos on vesidiplomatiaan liittyvän analyttisen viitekehyn perustaminen ja testaus. Viitekehyn luoma lähestymistapa koostuu kolmesta osasta: i) tutkittavan alueen nykytilan kartoitus ii) kahden veteen liittyvän konfliktipolin luominen ja iii) suositeltujen toimenpiteiden muodostaminen. Mahdolliset konfliktipolut kehitettiin vuoteen 2030 niin, että toisen lähtökohtana on veteen liittyvät jännitteet ja toisen poliittiset jännitteet.

Tapaustutkimuksien tulokset korostavat vesidiplomatiaan liittyvien toimenpiteiden mahdollisuksia ja rajoituksia veteen liittyvien konfliktien ennaltaehkäisyssä ja rauhanvälityksessä Irakissa ja Keski-Aasiassa. Esimerkiksi Keski-Aasiassa on suuri tarve uudistaa vanhentuneita vesisopimuksia, mutta valtioiden välinen luottamuksen puute on hidastanut kehitystä. Analyysi täydentää viimeaiskaisia globaalaleja vesijännitteisiin liittyviä tutkimuksia sekä alueellisia valtioiden välisiin yhteistyömekanismiin ja konflikteihin liittyviä selvityksiä.

Tämä tutkimus korostaa vesivarayhteistyön moninaisuutta tutkimalla rajat ylittävää vesiyhteistyötä vesidiplomatian näkökulmasta. Tuloksiin perusteella vesidiplomatian työkaluilla on paljon mahdollisuksia täydentää olemassa olevia yhteistyömekanismeja ja hallinnollista kehikkoa. Vesidiplomati voi olla toimiva tapa edetä vahvasti politisoituneissa konteksteissa (esim. Irak), joissa saavutettu vesiyhteistyö voi toimia muiden poliittisten jännitteiden lievittäjänä. Analyttistä viitekehystä tulee kehittää tulevaisuudessa mm. läpikotaisemmallla kvantitatiivisella analysillä sekä vuoropuhelulla ja työpajoilla paikallisten asiantuntijoiden kanssa.

Avainsanat Vesidiplomati, Vesivarayhteistyö, Konfliktipolut, Keski-Aasia, Irak

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I recall returning from my exchange in August 2018 with just my master's thesis missing to complete my studies, but with no clue of where to even start with. It turned out that my timing was perfect as I was asked to work as the main author in the multidisciplinary report "Vesidiplomattia - ennakoivaa rauhanvälitystoimintaa" commissioned by the Ministry for Foreign Affairs of Finland. During the writing process, the concept of an analytical framework for water diplomacy was born, which became the basis of this thesis.

I would like to express my sincere gratitude to the many people that have helped me complete the report and thesis. I would especially like to thank my thesis supervisor Marko Keskinen for having faith in my abilities and for providing continuous and insightful guidance throughout the working process. Marko and I devised and structured the analytical framework together and without our sessions I would have been well and truly lost. I also had the privilege of having two advisors: Olli Varis and Antti Rautavaara. For me, Olli was the wise mentor, who intervened only when needed but was always happy to help, while Antti was the beating heart behind the whole project, who made it and thus my participation possible in the first place.

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Kirjoitusprosessin lähestyessä loppua, palasin viimeistelemään tämän työni rakkaaseen kotikaupunkiini Turkuun. Eräänä yönä jokirantaa pitkin pyöräillessäni, kesäauriongoin vielä kajastaessa taivaanrannassa, tuli mietittyä koko opiskelujeni aikana kuljettua polkua. Tämä diplomityö on eräänlainen loppuhuipennus sille matkalle, joka alkoi lähdettyäni Turusta kohti suurta tuntematonta vuonna 2011. Kiitos teille kaikille, jotka olette tavalla tai toisella kirjoittaneet täitä tarinaa kanssani.

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Abbreviations

BRI	Belt and Road Initiative
CMI	Crisis Management Initiative
EIA	Environmental Impact Assessment
EU	European Union
EEU	Eurasian Economic Union
FAO	Food and Agriculture Organization of the United Nations
FIIA	Finnish Institute of International Affairs
GDP	Gross Domestic Product
HDI	Human Development Index
ICWC	Interstate Commission for Water Coordination
IFAS	International Fund for Aral Sea Saving
IIASA	International Institute for Applied Systems Analysis
IPCC	Intergovernmental Panel on Climate Change
ISIS	Islamic State of Iraq and Syria (terrorist organisation)
ISIMIP	Inter-Sectoral Impact Model Intercomparison Project
IWRM	Integrated Water Resources Management
MFA	Ministry for Foreign Affairs of Finland
NGO	Non-governmental Organisation
RBO	River Basin Organisation
RCP	Representative Concentration Pathway
SDG	Sustainable Development Goal
SSP	Shared Socio-economic Pathway
TWINS	Transboundary Waters Interaction Nexus
UEF	University of Eastern Finland
UN	United Nations
UNECE	United Nations Economic Commission for Europe
UniPID	Finnish University Partnership for International Development
UNWC	United Nations Watercourses Convention
WDRG	Water and Development Research Group (Aalto University)

1 Introduction

Water is a critical prerequisite for human life. It is the only natural resource that transcends national boundaries in a concrete and easily measurable manner through shared rivers, lakes and groundwater aquifers. Due to its political, economic, social and environmental interdependencies, water resources can either foster cooperation or create conflict (1, 2). Competition over shared waters is expected to rise as the effects of climate change, population growth, urbanization and water scarcity intensify (3).

Water diplomacy can complement existing water cooperation through its focus on politics and the utilization of diplomatic negotiation tools, facilitating peaceful solutions to conflicts over shared waters (4). Depending on the context, water diplomacy can play a vital role in situations where politics rule over all aspects of water cooperation or, on the contrary, when political tensions are not taken into account sufficiently (3). The rapidly rising importance of water diplomacy was addressed by the Council of the European Union (EU) in 2018, with the intention to “enhance EU diplomatic engagement about water as a tool for peace, security and stability” (5). Yet, due to the novelty of the topic, related research has been carried out mostly on a global scale and there is a lack of finer scale analyses and few established analytical frameworks.

The **primary objective** of this thesis was to establish an analytical framework for water diplomacy. To help with the objective, the following **Research Questions** were identified:

- How to define water diplomacy?
- What are the key elements of an analytical framework for water diplomacy?
- How can scenario thinking help to recognize potential for water diplomacy actions?

A fundamental part of the thesis was the multidisciplinary report “Vesidiplomattia - ennakkova rauhanvälitystoimintaa” (Water Diplomacy - Proactive Peace Mediation), commissioned by the Ministry for Foreign Affairs of Finland (MFA) in October 2018 and published in March 2019 (6). The report has four authors, with the author of this thesis as its main author. The objective of the report was to analyse two geopolitically interesting regions from a water diplomacy point of view. In order to perform a thorough analysis which could be reproduced in the future, an analytical framework for water diplomacy was required. The establishment of this analytical framework then became the foundation for this thesis. The case study regions of Central Asia and Iraq were chosen in a related workshop.

The most prevalent limitation for the work on the report was time, as the case study regions required a vast amount of background research and the MFA was operating on a tight schedule. Therefore, it was crucial to create the analytical framework in such a manner that it included sufficient regional context to form feasible scenarios and water diplomacy actions.

The thesis is structured in the following way. First, I describe the research context through two focus points: water cooperation as well as security and diplomacy, with an emphasis on water security, before moving on to the methodology section. In the results section, I establish the analytical framework before showcasing findings from the Central Asia case study. The main findings of the Iraq case study can be found in Appendix 1. In the discussion section, I assess the analytical framework and case study results before concluding the thesis.

2 Research Context

This thesis builds on two main fields of study: water cooperation as well as security and diplomacy, with a special focus on water security. Both of these fields were studied using a comprehensive literature review in order to form a general context for water diplomacy.

2.1 Water cooperation

Water has been described as the bloodstream of the planet as it drives the critical functions of many terrestrial systems, such as forests, woodlands, grasslands and crop lands (7). While water is one of the most common resources in the world, only a fraction (2.5%) of it is available for human consumption, with the vast majority of fresh water being confined to glaciers and permanent snow cover (8). Water cooperation is crucial as global water challenges grow increasingly difficult to manage.

Global water consumption is rising much faster than human population growth, roughly doubling every 20 years (9). The United Nations (UN) states that in 2018, 844 million people lacked access to safe drinking water (2). Over-exploitation and pollution can have dire consequences on water supplies, which might lead to international tensions when the impacts spread (10). Practically every state with land borders shares water resources with its neighbours and there are approximately 286 transboundary river basins, which serve as a primary source of freshwater for 40% of the global population (1, 10, 11). Yet, about 60% of international river basins lack any cooperative management framework (12).

Water cooperation can be defined as different actors working together in regard to water use (13). It relies on actors acknowledging that working together on shared watercourses is more beneficial than unilateral actions (4). Water cooperation is integrally linked with agriculture and energy production (14). The major component of human water use is agriculture, which takes up over 70% of the share, followed by 20% to industry and 10% to households (15). Additionally, water pollution has become an issue in major rivers in Africa, Asia and Latin America due to outdated agricultural methods (9). In regions such as Central Asia tensions between downstream and upstream countries are historically linked with hydropower projects due to the effects of dams on river flow (16). Growing water scarcity and the effects of climate change on temporal and spatial water availability heighten these tensions.

Water cooperation is therefore by no means easy. Genderen and Rood (17) identify the following obstacles for successful water cooperation:

1. an upstream hegemon without the political will to cooperate;
2. conflicting perceptions of water entitlements;
3. rapid demographic or environmental changes in the river or aquifer basin;
4. large unilateral development projects without consultation;
5. lack of a treaty between riparian states;
6. absence of River Basin Organisations (RBO); and
7. general hostile political relations.

These obstacles can be solved with good bilateral relations, regional treaties, RBOs and actions to ease water scarcity and interdependence (17). International treaties, cooperative mechanisms and knowledge sharing are examples of possible tools to ease tensions (18).

The importance of water cooperation has been recognised globally. In September 2015, all of the 193 members of the UN unanimously agreed to “Transforming the World: the 2030 Agenda for Sustainable Development” (the 2030 Agenda) with 17 Sustainable Development Goals (SDGs) and 169 global targets (19). The importance of water cooperation is highlighted by SDG 6, which aims for sustainable water management and sanitation for all (2). The 6.5 target recognizes the importance of Integrated Water Resources Management (IWRM) by stating the need to “implement IWRM at all levels, including through transboundary cooperation as appropriate” (19). The indicators for target 6.5 are: “Degree of Integrated Water Resources Management (IWRM) implementation (0–100)” and “Proportion of transboundary basin area with an operational arrangement for water cooperation” (19).

Transboundary water cooperation relies on the understanding that shared water management is beneficial for all involved parties (4). This is in line with the principles of IWRM, which state that water, land and related resources should be developed in unison to maximize economic and social welfare as well as sustainable development (20,21). Daoudy (22) lists numerous benefits of basin-wide cooperation such as flood control, drought mitigation, hydro-power and optimal environmental management but also warns about inequitable access to water being a trigger for conflicts. While IWRM has been addressed and identified as an important aspect of water cooperation through the SDGs, the core issue is that a universal blueprint for implementation remains elusive (2, 21).

The 2018 UN SDG 6 Synthesis Report (2) states that average implementation of IWRM is as high as 48%. However, there are great variations between countries, with developing countries not in line to meet the targets set for 2030 (2). Criticism towards IWRM implementation generally focuses on a lack of practical instructions on how to apply it, dysfunctional institutional frameworks, vague goals and targets and a disregard for local contexts and social aspects (23–25). Despite these issues, IWRM might well be the best available option for a comprehensive water cooperation and management tool currently available.

International water treaties provide a legal framework for regional and bilateral water cooperation that also reflect on the national level. Currently there are two active international water treaties: the United Nations Economic Commission for Europe (UNECE) Convention on the Protection and Use of Transboundary Watercourses and International Waters (1992) and the UN Convention on the Law of the Non-Navigational Uses of International Watercourses (1997), commonly known as the UN Watercourses Convention (UNWC) (26).

The UNECE Convention was signed in 1992 and entered into force in 1996 (27). It was initially negotiated as a regional instrument, but it has since been amended to become universally available (28). The main contents of the UNECE water convention relate to preventing, mitigating and controlling transboundary water problems and it has been ratified by 42 states and the European Union (28). The UNWC was adopted in 1997 and it entered into force in 2014 (27). It is considered to be the primary legal instrument for transboundary water management and as of 2019 it has been ratified by 36 states (26, 27). The UNWC contains three key principles of international water law:

- The principle of equitable and reasonable use
- The obligation not to cause significant harm
- The duty to cooperate (prior notification of works which may affect co-riparian states)

Due to the history of the two conventions, there have been suggestions of mutual exclusiveness. However, research has shown that the conventions rather complement each other (29). The UNECE water convention provides generally more detailed guidelines especially related to water quality standards and the prevention of transboundary impacts, while the UNWC contains more guidance on equitable and reasonable use (28, 29). Together the two global conventions provide crucial elements for improving transboundary water cooperation.

The key critique of the UNECE water convention and UNWC is that as there is no universal recognition of key principles. Many states prefer to negotiate their own treaties and only accommodate the parts of the conventions which suit them (26). The issues are highlighted in upstream and downstream riparian relations where many states consider the conventions to be biased. McIntyre (30) notes that “upstream states tend to favour the principle of equitable and reasonable use while downstream states invoke the duty to prevent significant transboundary harm” while Phillips (26) highlights the issue of “basin hegemons” or politically dominant states neglecting the principles in order to reserve transboundary waters for their own use. However, despite the misinterpretations and misgivings, the principles do often function as guidelines that influence states that are not parties to the conventions (31).

The relationship between water cooperation and conflicts is fascinating, with recent UN Secretary Generals having all declared that competition over scarce water resources could lead to violent conflicts. In 2017, Secretary General António Guterrez highlighted the links between water cooperation, peace and security by stating that “water serves as a catalyst for cooperation among nations, even those that are not on good terms” (32). While strictly water conflicts are yet to surface, the possibility has not disappeared and the probability is lifted due to global water challenges, such as uneven distribution, eroding quality and misuse as well as societal tensions (21, 26, 33, 34).

The possibilities of water as a cooperative instrument are widely acknowledged (1, 17, 21, 26, 32). In fact, there are many more cases about shared water cooperation than water conflicts (295 international water agreements since 1948 and only 37 incidents of acute conflicts over water) (10, 35). A recent report by the Strategic Foresight Group (11), highlights the importance of transboundary water cooperation, by stating that “any two countries engaged in active water cooperation do not go to war for any reason”. Zeitoun and Mirumachi (36) state that in order to obtain a wider perspective, the separate concepts of conflicts and cooperation should be merged into interactions. Water diplomacy efforts could also benefit from the consideration of the dual nature of these interactions, when preventing and mitigating transboundary water conflicts.

2.2 Security & diplomacy

The second field of study related to water diplomacy introduces general security and diplomacy aspects of modern society, with an emphasis on water security.

Security

Security has several dimensions and scales. Haftendorn (37) discusses security from a national, international and global perspective while Buzan (38) argues that it is divided into five interlinked sectors: military, political, economic, societal and environmental. In order to analyse national and international security, all of these concepts need to be studied individually to understand their connectivity (39).

The concept of security has developed considerably since the Cold War, becoming much more multifaceted and complex (39). In the past, state security was prevalent, with emphasis on responding to military, political and economic threats (40). Buzan (40) broadened the framework of security by introducing societal and environmental security sectors.

Societal threats are closely linked to the political sector as they deal with identity and balance (and lack of balance) that can be found in any given state (39). Most modern conflicts have societal elements, such as in Afghanistan, where cultural ideological and ethnic differences make up tribal boundaries, which have been bundled into a state (40). The environmental sector is hard to define and sometimes controversial as natural disasters are impossible to control, but more recently human induced environmental threats such as global warming have emerged (39). The interconnectivity of the sectors is apparent as effective counter initiatives to these widespread effects require economic and political security (40).

The Finnish concept for comprehensive security aims to mitigate all security threats through mutual cooperation by all societal sectors: authorities, private sector, organisations and citizens (41). This desirable approach is not without issues though, as it needs to deal with the conflicting ambitions of the different sectors. Keskinen et al. (42) identify the need for processes that bring together the differing sectoral needs and information as well as further study on relevant power relations and policy.

Diplomacy

Diplomacy is an important aspect of international security, which complements internal security aspects (43). Diplomacy can be loosely defined as “the art and practice of conducting negotiations between nations” (44). It is strongly connected to foreign affairs and foreign policy, with the former providing the general subject and the latter the specific manifestation (44). Diplomacy itself is mostly used to prevent conflicts and to improve cooperation through negotiations, discussion and fact finding missions (45, 46).

In the past, diplomacy focused solely on state security. While modern diplomacy still needs to respond to state security threats, a great deal of attention is put to human security, which constitutes the health and security of human beings and their environment (45). Modern diplomats need to rapidly adapt to this changing diplomatic environment by understanding the needs of both of these sectors through efficient science-policy interaction (18, 45).

Hocking et al. (45) introduce the concept and framework of **integrative diplomacy** (Figure 1) which intends to capture key characteristics for appreciating diplomatic challenges for policy makers in the modern era. The four identified dimensions of the framework are: context and locations, rules and norms, communication patterns and actor roles (45). The need for collaborative relationships is highlighted and could be achieved through knowledge exchange which aims to bring researchers, decision-makers and other relevant stakeholders together (18). To aid in this task, Reed et al. (18) introduces five principles of knowledge exchange: design, represent, engage, impact and reflect and sustain.

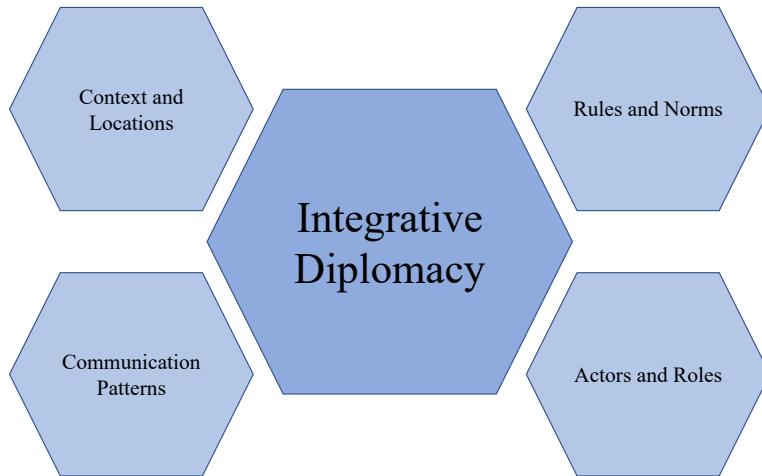


Figure 1: Integrative diplomacy, modified from (45)

Another important concept is **multi-track diplomacy**, which was developed to ease peace building processes by identifying actors and their operating environments. Track I mainly consists of state actors while track II constitutes non-governmental actors, such as experts and non-governmental organisations (NGO) (47, 48). Other tracks range from track III: business to track IX: public opinion and media (49). The crucial aspect of multi-track diplomacy is the realization that negotiations are often taking place at several levels, which might lead to different tracks becoming intertwined (48). In fact, it is improbable that a solution can be found by focusing solely on a single track, especially in complex situations, such as bilateral water security related issues.

Water security

Water is often identified as a crucial part of global security threats as it is essential for all aspects of life (21). Fear of wide-spread water-related conflicts rose during the latter part of the 20th century as epitomized by Ismail Serageldin, Vice President of the World Bank (33): “the wars of the next century will be fought over water unless we change our approach to managing this precious and vital resource”. These fears led to further research on water security and its aspects.

UN Water defines water security as “the capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water related disasters, and for preserving ecosystems in a climate of peace and political stability” (50). Wouters (51) identified three important elements for water security:

- Freedom from want, freedom from fear and freedom to live in human dignity
- Conflicts of interest must be identified and effectively dealt with at international, national and local levels
- Water security is a dynamic concept that requires local champions and sustained stewardship

Initially, water security focused on the quantity and quality of water resources, such as pollution, relative distribution and absolute distribution, but newer definitions have taken into account other interlinked aspects, such as food and energy (52, 53). In response to concep-

tualizations that relied solely on the physical aspects of water resources, Zeitoun (54) developed the “global web of national water security” (Figure 2), which consists of six interlinked security sectors: human, national, water resources, food, energy and climate security (55). This broad definition places sustainable water security in the center of the web where it is interpreted as the balance point between the different forces (56). The web also connects diplomacy to water security through the dimension of human security (21, 45).

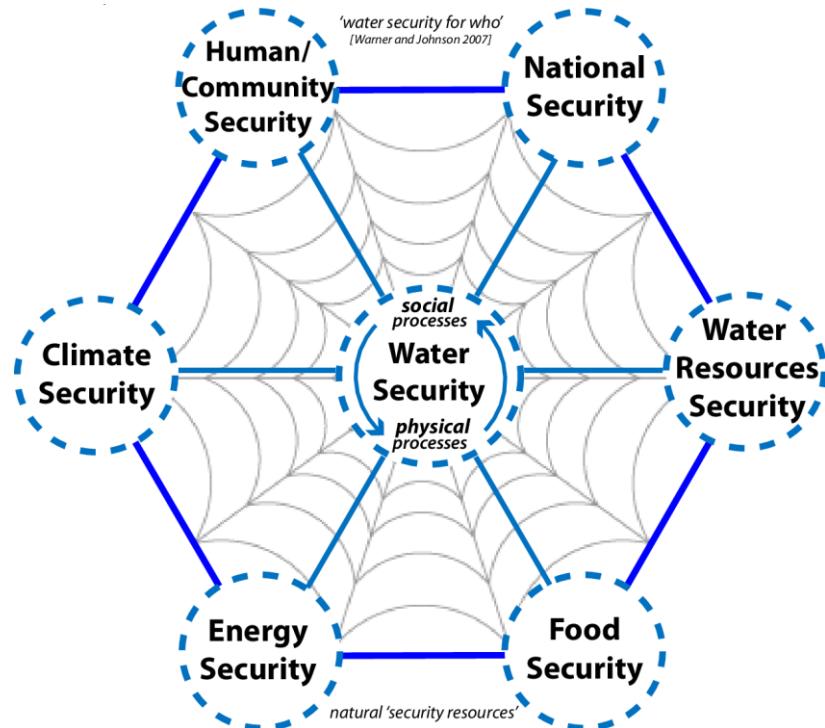


Figure 2: Global web of national water security (54)

As noted in Figure 2, water security is closely intertwined with other sectors, especially food production, which is the largest consumer of water globally (46, 56, 57). Increased droughts and heatwaves combined with fluctuating growing seasons and precipitation patterns are expected to have a huge impact on crop yields in the future, which is why water efficiency, agricultural productivity and technologies related to the reuse of water and wastewater need to be improved in order to meet the rising demand (58, 59). All of these sectors are brought together by the water-food-energy security nexus approach, which concentrates on the interlinkages of the sectors (60, 61).

IWRM has been proposed as the mechanism to ensure water security, but as mentioned in the previous chapter its implementation has proved to be challenging (21). Emerging trends such as securitization of water resources has considerable implications for water security, as on one hand it might lead to nations safeguarding water resources from others, while on the other it could lead to the establishment of international agreements over shared waters (56).

There is growing international consensus that further research and actions related to water security are essential for the future as they address conflicts that arise over shared water resources (62). As global water challenges highlight the importance of water in international relations, diplomats need to become accustomed to the linkages of water to all aspects of societal security. In the future, water security development schemes should take into account pressing human security needs while advancing transboundary water management (21).

2.3 Water diplomacy

Natural, societal and political interactions are at the heart of complex water-related problems (63, 64). There is an increasing demand for efficient solutions to these issues that mix policy, security and science instead of only addressing water in isolation (18, 54, 63, 65). Water diplomacy takes into account crucial dimensions of integrative diplomacy to work as a method for water security in order to achieve peaceful water cooperation. Three further definitions of water diplomacy are outlined in Text Box 1.

Text Box 1: Definitions of water diplomacy

Water diplomacy, also referred to as hydro-diplomacy, can be broadly defined as all contact between (non-) state actors and at least one state or international governmental organizations over transboundary freshwater resources such as lake, river and aquifer basins (17).

Water diplomacy includes all measures by state and non-state actors that can be undertaken to prevent or peacefully resolve (emerging) conflicts and facilitate cooperation related to water availability, allocation or use between and within states and public and private stakeholders (14).

Water diplomacy can be defined as the use of diplomatic instruments to existing or emerging disagreements and conflicts over shared water resources with the aim to solve or mitigate those for the sake of cooperation, regional stability and peace (4).

From the definitions in Text Box 1, the following conclusions can be made. The aim of water diplomacy is to facilitate cooperation over water resources using diplomatic instruments (4). The scope of water diplomacy encompasses state and non-state actors and it is used to both prevent and resolve conflicts (4, 14, 17). The ultimate aim of water diplomacy is cooperation, stability and peace.

Previous studies on water diplomacy

The aforementioned definitions do not explicitly distinguish different levels of water diplomacy. Genderen and Rood (17) identify three levels: bilateral, multilateral and basin wide, which are all connected by a global framework. There is a wide variety of publications discussing the different aspects of water diplomacy, yet previous research has largely focused on understanding the phenomena behind water conflicts, defining water diplomacy and studying it on a global scale instead of more detailed regional or national analyses (1, 36, 46, 63, 66). I will next shortly introduce key publications related to water diplomacy.

Zeitoun and Mirumachi (36) recognized the coexistence of conflicts and cooperation and created a new approach, the Transboundary Water Interaction Nexus (TWINS) to analyse them in regard to international transboundary water management. The key finding of the TWINS approach is that basins differ in their international transboundary relations when relations shift through conflict and cooperation (36). With the approach it is possible to classify transboundary water relations and to illustrate the dynamics of conflicts and cooperation.

Islam and Susskind (63) identify six key tasks or “best practices” for water diplomacy: stakeholder representation, joint fact-finding and scenario planning, value creation, convening, collaborative adaptive management and societal learning. They then use these findings to create a water diplomacy framework, which provides guidelines for solving actual water management issues (Figure 3) (63).

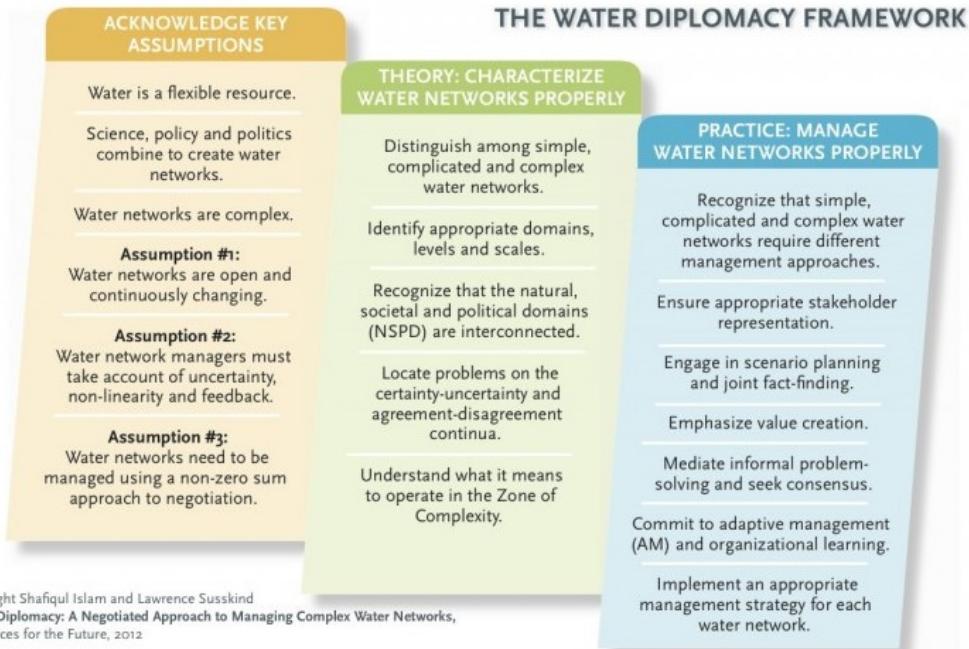


Figure 3: The Water Diplomacy Framework (63)

These guidelines recognise the complexity of water networks and challenges and intend to take into account diverse and interdisciplinary interests of all sectors. It builds upon the global web of national water security by Zeitoun (54) and acknowledges the need to create interactions between actors through such practices as stakeholder representation and value creation (18).

In 2014, Adelphi stated that international policymakers and technical experts should work together to advance conflict prevention and create more efficient cooperation mechanisms (1). This is echoed by Reed et al. (18) who state that interactions between stakeholders are often conducted without systematic and research-based grounding. The Adelphi report (1) alongside Huntjens and de Man (46) highlight the importance of engaging state and non-state actors in the creation of RBOs and negotiating international water treaties.

Farinosi et al. (66) provide a quantitative basis for the assessment of SDG 6.5 and in particular indicator 6.5.2 involving transboundary water cooperation. The article is a good example of a technical global-scale water diplomacy analysis that builds upon the idea of Zeitoun and Mirumachi to merge tensions and cooperation together as interactions (36, 66). The loss of definition is irrelevant, as the interactions indicate water allocation or management issues regardless of their nature.

Farinosi et al. (66) establish a baseline scenario through the use of representative concentration pathways (RCP) in order to identify future water conflict prone areas. The RCPs are anthropogenic greenhouse gas concentration trajectories adopted by the Intergovernmental Panel on Climate Change (IPCC) in 2014, which aim to represent corresponding climate

conditions in the future (67). The identified hotspots (Figure 4) constitute areas of possible hydro-political risk, that could be aided through cooperative action (66).

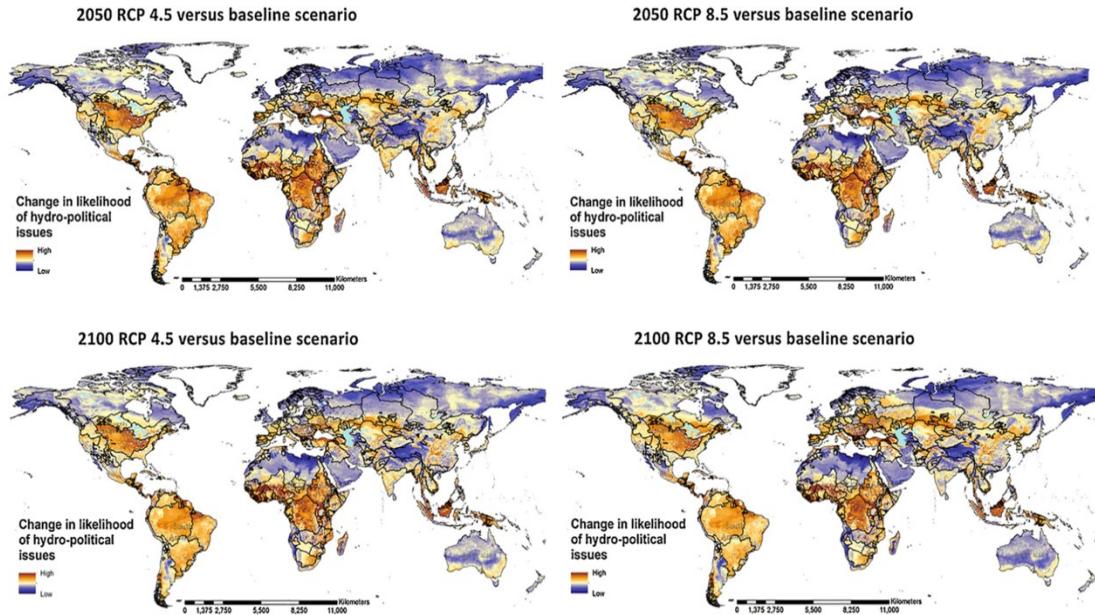


Figure 4: Changes in likelihood of hydro-political issues (66)

Population density, water availability, upstream/downstream dynamics, territorial and power imbalance and climatic conditions represent the most relevant factors for hydro-political interactions (66). The results can be misleading though, as they don't take into account historical, cultural and religious aspects. For example, Kibaroglu et al. (68) highlight the need for regional water cooperation to accommodate pressing human security needs which directly contribute to water conflicts especially in the Middle East.

All of the aforementioned works have studied water conflicts and water diplomacy potential on a global scale. Farinosi et al. (66) tries to predict the likelihood of hydro-political interactions by combining various data sources and past tensions, but one key ingredient is missing. Both Zeitoun (54) and Huntjens and de Man (46) state, that in order to efficiently study regional and national contexts, much more care needs to be put into understanding aspects such as political history, culture, religion and their effects.

Water diplomacy vs. water cooperation

What separates water diplomacy from water cooperation and transboundary water management is the instruments, as water diplomacy is about applying diplomatic instruments in unison with technical ones (4). These instruments include negotiations, dispute-resolution mechanisms, the establishment of consultation platforms and the organization of joint fact-finding missions (4, 63, 69). Water diplomacy actions can lead to a wide variety of outcomes, such as scientific and economic cooperation, international treaties and joint institutions (17).

Another difference between water diplomacy and water cooperation is the baseline assumption (4). Water cooperation and transboundary water management are based on the recognition of mutual benefits from shared water resources by all relevant parties (22). Water diplomacy on the other hand deals with disagreements, which arise from conflicting interests (4). Despite these definitive differences, water diplomacy has enormous potential to complement the more technical fields and vice versa by bringing different actors together (3, 63).

Water diplomacy actors

Multi-track water diplomacy recognizes the importance of different level actors in negotiating water treaties and establishing RBOs (1, 17, 65). As Huntjens et al. (14) states, water diplomacy brings together all state and non-state actors. Track I actors, such as ministries and government officials are already well established, but track II and III actors, such as conflict resolution professionals, NGOs and businesses can play an increasingly important role in the future as the demand for international water management and governance grows (17, 33). External actors, such as UN agencies and other international organisations help establish an enabling environment for water diplomacy (65).

The need to engage foreign policy makers is increasingly recognized as their interest can be beneficial for all actors involved (18, 65). In some settings, cooperation over shared water resources is hindered by a volatile political climate. In this case, the escalating political situation leads to tensions and conflict despite a possibly well-functioning water cooperation system. Conversely water cooperation can be too non-political, in which case focus is solely on physical and technical aspects of shared water resources, neglecting and even hiding political tensions. According to Keskinen et al. (3) introducing water diplomacy measures often consists of two mutually supplementary aspects, bringing water into diplomacy and diplomacy into water cooperation:

- Bringing water into diplomacy consists of bringing information on water and related natural resources to be a part of geopolitics and diplomacy, with the aim of increased and shared understanding of the state of water resources and possible future changes (3).
- Bringing diplomacy into water cooperation concentrates on the political aspects of water use and water cooperation with the aim of solving water related tensions with diplomatic tools, such as negotiations and mediation mechanisms (3, 4).

At its best, proactive peace mediation through water diplomacy builds upon cooperation, where diplomats gain information and understanding on water related issues and water experts gain understanding on geopolitic realities and possible solutions through diplomacy and peace mediation (3, 18). This increased interest from foreign policy officials improves and intensifies water resources cooperation, while successful water governance advances foreign policy objectives (1, 18).

Water diplomacy promises a dynamic way to uphold water cooperation and ease water related tension (70). Its significance will continue to rise as demographic and climatic megatrends lead to intensified global water challenges (1).

2.4 Global water challenges

Megatrends are global, long-term phenomena which have fundamental implications on the economy, society, culture, environment and human lives. Climate change, population growth and urbanization are examples of such megatrends that are contributing to global water challenges such as increased water scarcity (14). Water diplomacy is often promoted as a strategy for mitigating and resolving these challenges (71).

The global water situation is getting increasingly worse due to the effects of human induced climate change on the Earth's conditions (1, 14). These effects include rising temperatures, sea level rise, shrinking of arctic ice cover, changing crop yields, seasonal climatic changes and a growing occurrence of extreme weather events (58, 72). Climate change can exacerbate conflict by making food systems more fragile, slowing economic growth, increasing human health issues, causing mass emigration as well as weakening infrastructures (72). The effects are global and all-encompassing, with weaker economies and societies being more susceptible to the effects (65, 72).

Climate change will have severe consequences on fresh water availability globally, with a majority of the effects focused on already water stressed areas (Figure 5) (12).

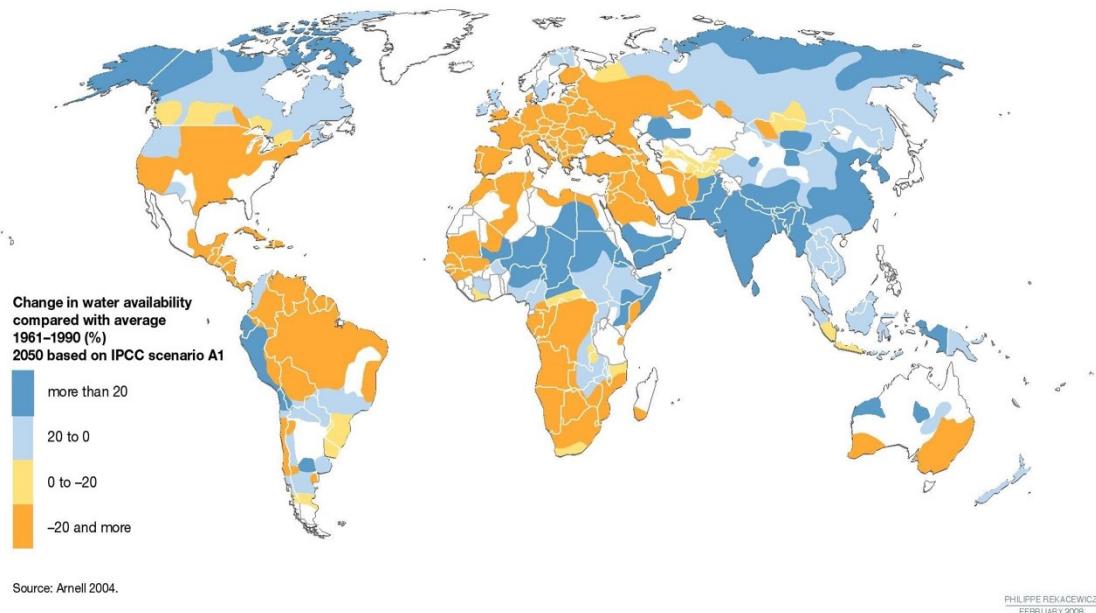


Figure 5: Changes in water availability (12)

According to the UN, world population is expected to increase from 7.3 billion people (2015) to 8.5 billion by 2030 and 9.6 billion by 2050 (73). Africa has the highest population growth rate and it is expected to account for more than half of the world's population by 2050 (73). Increased life expectancy and reduced child mortality is being countered by lower fertility rates in other parts of the world (73). Population growth also fuels urbanization. By 2050 an expected 68% of the world's population will live in urban areas compared to 55% in 2018 (74).

The increase in population and the resulting concentration of people into cities leads to increased domestic, agricultural and industrial water use as well as water pollution (14). Coupled with the effects of climate change, the results will be dire. The amount of people living in water scarce areas has increased from 0.24 billion in 1900 to 3.8 billion in 2000, with water consumption quadrupling during the same study period (75). The UN World Water Development predicts that by 2050 between 4.8 and 5.7 billion people will be living in water scarcity (76).

Physical water scarcity means that the water resources of a certain area are not sufficient enough to answer the needs, meaning that demand should be reduced or supply increased (13). It is studied on different levels and it can be divided into two categories: water stress

and water shortage (13). Water stress deals with demand-driven scarcity as the impacts are due to high consumption relative to availability (75). Even a small population can experience water stress, if water use is sufficiently high and water availability low. Water shortage on the other hand is driven mostly by population as its impacts are due to low availability per capita (75). Water shortages occur when water availability is sufficiently low and the population sufficiently high.

Global water challenges are difficult to tackle due to their scale, urgency and complexity (46). In addition to the aforementioned physical water scarcity there are several other aspects that create tensions related to diversity in society and environment (55). For example, in Central Asia climate change is melting glaciers that feed the great rivers of the region (77). This leads to tensions as seasonal fluctuations in water availability create problems for the water intensive agriculture in the region (16). Additional problems include the effects of increased water use in upstream countries and salinization and soil degradation caused by extensive irrigation and fertilizer use (77, 78). Societal issues such as poverty, unemployment, inequality, corruption and historical or religious tensions deepen the divide between stakeholders making it increasingly difficult to find solutions (46).

In order to identify solutions for these complex global challenges, it is crucial to recognise that there is no easy way out. An adaptive approach is needed which considers the physical aspects of water as well as its societal, economic and climactic connections (46, 54). Methods such as open access data, third party cooperation and knowledge sharing could prove to be useful tools in the future (18, 46, 63).

3 Methodology

This study initially utilized three research methods to collect and analyse data: literature reviews, workshops and collecting comments from experts (Phase I). As the analytical framework evolved, new methods were applied in the form of co-writing, scenario thinking and quantitative analysis (Phase II). Finally, the case studies were used to test and finish the analytical framework by providing a practical context for the analysis (Phase III). The methods are illustrated in Figure 6.

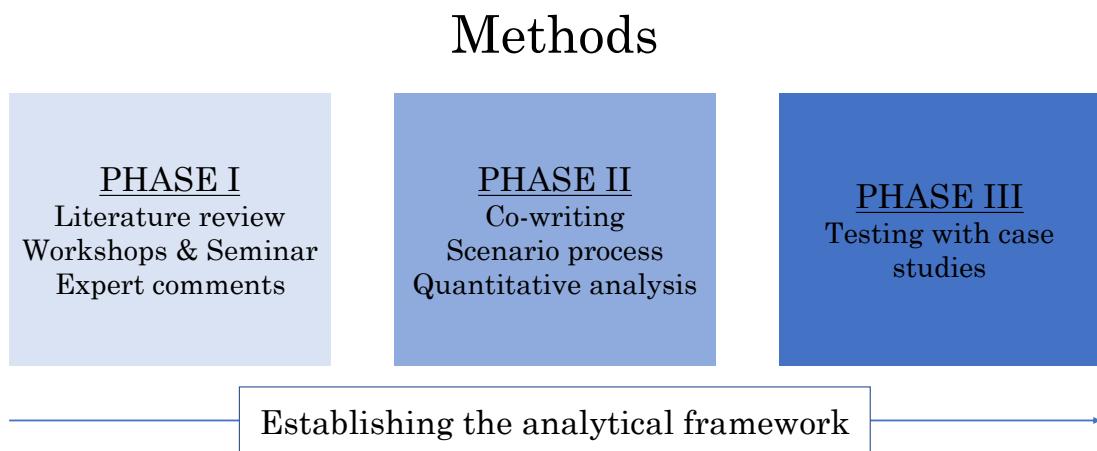


Figure 6: Methods for establishing the analytical framework

All of the aforementioned methods were utilized in the work for the water diplomacy report and therefore also throughout the thesis process to establish and review the analytical framework (6). A short summary of the methods is presented below.

3.1 Phase I: Building the foundation

Literature review

Literature review was utilized continuously throughout the entire study. First to provide context for water diplomacy, then to define the research objectives and gaps, and to investigate the case study regions and relevant analysis methods, and finally when discussing the key findings of the work. The literature review of water diplomacy was separated into two distinct perspectives: water cooperation as well as security and diplomacy.

Most of the literature used was either searched with key words from publication databases or suggested by the supervisor and advisors of the thesis. Additional sources were identified from the bibliographies of relevant works. Information related to the case study regions was provided through literature suggestions from experts. All of the recommendations helped in reducing the time needed for the analysis, as there is a vast amount of related literature available.

The literature analysis was also used to identify possible sources of data for the case study regions. The most important data sources were the World Bank, the UN, the Water Scarcity Atlas and Transparency International. The Water Scarcity Atlas has been created at Aalto University and was used to investigate future water scarcity development with help from Joseph Guillaume from the Water and Development Research Group (WDRG) as it allows interactive future visualizations, based on different scenarios (13).

Workshops

Several workshops were held during the water diplomacy analysis done for the MFA and they therefore also formed a key part of this thesis. The foundation of the analysis was created in the first workshop, where the possible case study regions were identified. Two workshops were also held with the steering group for the Water Diplomacy project, which helped to define the objectives and scope of the analytical approach. Several meetings with the main contributors were held around and between workshops.

The first workshop took place at Aalto University, with the objective of determining case study regions for the water diplomacy analysis done for the MFA. The workshop was planned and facilitated by Marko Keskinen and Erik Salminen, i.e. the supervisor and author of this thesis. The workshop was divided into three parts: i) introduction to water diplomacy and context ii) introduction of the possible case study regions based on an inquiry preceding the workshop iii) group discussion on the possible regions and finally iv) selection of a short list of possible areas based on the discussions. The short list was then handed to the MFA, where the final case study regions of Central Asia and Iraq were chosen internally. The workshop was hosted by Aalto University, the MFA and the University of Eastern Finland (UEF) and attended by several key stakeholders (see Phase III).

The workshops and steering group meetings were important in gaining feedback and narrowing down the scale of the study. They also helped establish a network of interested parties, that provided valuable information on the case study regions.

The water diplomacy report and its findings were discussed in a final seminar at the Finnish Institute of International Affairs (FIIA) on 14th of March 2019. The seminar was co-organised by Aalto University, UEF, MFA & FIIA, and attended by over 60 participants from different fields, whom all received the latest version of the water diplomacy report one week prior to the seminar. The seminar was chaired by senior development advisor Antti Rautavaara and opened by Elina Kalkku, undersecretary for development policy, both from the MFA. After presenting the results from the water diplomacy report the presenters and attendees proceeded to discuss the findings and possible future steps for water diplomacy in Finland. Some final feedback regarding the analytical framework, the scenario process and the project in general was also received.

Expert comments

The aforementioned network of experts provided an opportunity to obtain feedback on the analytical framework and case studies during the whole writing process. The culmination of this method was the comment round for the water diplomacy report draft, set at the second steering group meeting. The comment period lasted from 1.2.2019 to 22.2.2019 and provided comments from representatives of the MFA, Ministry of Environment, Finnish Environment Institute and FIIA.

Potential commentators were chosen based on interest in the workshops, suggestions by workshop participants as well as known expertise on water cooperation, diplomacy and the case study regions. Due to time constraints and the fact that the report was written in Finnish, only Finnish-language experts were consulted, but future plans include the inclusion of local expertise. The commentators were sent an email explaining the objectives and background

of the analysis. When requesting comments, emphasis was put on the functionality, positives, negatives and possible improvements for the analytical framework as well as more specific feedback on the case studies.

Antti Rautavaara, who was also the main counterpart from the MFA for the project, assisted in obtaining a policy-related perspective for the analysis while acting as a second advisor for the thesis. His insight and range of contacts in the ministry and beyond were a valuable resource for the analysis.

3.2 Phase II: Strengthening the structure

Co-writing

The writing of the water diplomacy report was shared between UEF and Aalto University. The purpose of this cooperation was to utilize the respective areas of expertise of the two universities to their full potential. The WDRG at Aalto has a strong foundation in water governance and integrated water resources management, while UEF specializes in environmental law. Combining these two faculties brought a valuable addition of multidisciplinary processes to the project.

Senior lecturer Tuula Honkonen and professor Antti Belinskij from UEF were responsible for the legal analysis in the report while senior lecturer Marko Keskinen from Aalto University contributed heavily to the establishment of the analytical framework and provided comments and feedback throughout the report and thesis process. Joseph Guillaume from Aalto University provided the quantitative analysis with the Water Scarcity Atlas. Some of the material written by Antti Belinskij, Tuula Honkonen, Marko Keskinen and Joseph Guillaume has been translated and used in the case study sections of this thesis.

Scenario thinking

An important part of the analytical approach is the creation of future Conflict Paths for the case study regions with the help of scenario thinking, using a timeframe until 2030. IPCC defines a scenario as *a coherent, internally consistent and plausible description of a possible future state of the world. It is not a forecast; rather, each scenario is one alternative image of how the future can unfold* (79).

Analysing the future is challenging, as the results of, for example, climate change, technological advancements and socio-economic changes are difficult to foresee. Additionally, both of the case study regions are large and have a complex political atmosphere and the timeframe is significant. Due to these reasons, the Conflict Paths were created by using the *multiple plausible scenarios* method instead of concentrating on a static one-sided approach (80).

The basis of *multiple plausible scenarios* is to create many flexible strategies, that have been tailor-made for different global circumstances and represent plausible developments with different presumptions (Figure 7). When for example the knowledge regarding a certain region increases, the strategy can be easily changed during the planned timeframe. By themselves the multiple strategies might seem weak, but as knowledge regarding the region increases, the strategies are combined to complement each other and thus represent realized development (80).



Figure 7: Differences between a static approach and an adaptive approach (80)

Quantitative analysis

The main method for quantitative analysis in this thesis is the Water Scarcity Atlas. The Atlas is essentially an interactive website developed and maintained by the WRDG at Aalto University, and it provides information on global water scarcity, how it has changed in the past and how it is predicted to develop in the future (13).

Future water scarcity was investigated by Joseph Guillaume from the WDRG using the Atlas, which allows interactive visualization of possible future scenarios for water use and availability, based on modelled estimates from the Inter-Sectoral Impact Model Inter-comparison Project (ISIMIP) (81).

The socio-economic scenarios include changes in domestic and industrial water use quantified with the Water Futures and Solutions program by the International Institute for Applied Systems Analysis (IIASA) (82). The scenarios are based on Shared Socio-economic Pathways (SSP), developed by the IPCC. The SSPs are a set of five different socio-economic scenarios, that explore the effects of societal choices on greenhouse gas emissions and climate change. The SSPs are designed to complement RCPs, which purposely lack socio-economic aspects, rather concentrating on the possible amount of warming (83). They contain five different narratives, which allow researchers to predict how the world would look without climate policy in order to identify barriers and opportunities for climate mitigation and adaptation (84). The scenarios in the analysis respectively correspond to “Sustainability”, “Middle of the road” and “Regional rivalry”. The visualizations from the Atlas will be presented in the Case Study section.

3.3 Phase III: Case study analysis

Case studies

Case studies were used to bring the different methods together and test the analytical framework in selected case study analyses. The use of case studies was crucial for the establishment of the analytical framework as they can be used to understand complex social phenomena, such as life cycles, organizational processes and international relations. Case studies are preferred when the focus is on contemporary real-life events and when the investigator has little control over them (85). Both of these criteria are present in the study.

As mentioned before, the case study regions of Central Asia and Iraq were chosen for this study. Two distinct cases were chosen to provide meaningful insight into the contrasting situations of the two regions (theoretical replication). Additionally, the evidence from mul-

multiple cases is often viewed as more compelling and robust, which is important in the establishment of a novel analytical framework (85). Representatives from a wide variety of stakeholders, such as the MFA, FIIA, the Finnish Ministry of Environment, the Finnish Environment Institute Aalto University, UEF and Crisis Management Initiative (CMI) were present in the workshop for choosing the case study regions. The case studies proved an invaluable asset in the testing and development of the established analytical framework.

4 Establishing an Analytical Framework for Water Diplomacy

In this chapter the analytical framework for water diplomacy is established through the study of water diplomacy, establishment of a simplified scenario process as well as through identifying and formulating key elements for a water diplomacy analytical framework. The work is based on the water diplomacy report created for the MFA (6).

4.1 Setting the stage for water diplomacy analysis

A well-coordinated water diplomacy approach makes it possible to prevent internal and external conflicts by building capacity and reliable networks between actors and by identifying solutions to water related conflict situations through diplomatic tools and technical knowledge on water resources (4, 17, 69). In order to establish a functioning analytical framework, the following aspects were identified to be investigated: the current state of the regions and nations as well as their possible futures in regard to trends and possible water diplomacy actions. The Water Diplomacy Framework, created by Islam and Susskind (63) was an important basis for the establishment of this finer scale analytical framework as it addresses the complexity and interdisciplinarity of water challenges.

By making use of the findings of Wouters (51) and Genderen and Rood (17), namely regarding the levels of water security: local, national and international, and water diplomacy: bilateral, multilateral and basin wide, respectively, it was possible to identify relevant geographical scales for this analysis. The identified scales are as follows:

- Regional (several countries and water bodies, e.g. EU, Central Asia, East-Africa)
- Transboundary water (shared by several states, such as the Mekong river)
- Bilateral (two countries and one or more shared water body)
- National (different uses of water in one or more water bodies)

Especially the inclusion of a national scale of water diplomacy can be seen as a novelty, as the most often cited lowest level of water diplomacy is bilateral. In this analysis, the national level was a crucial addition, as the Iraq case study focused on a single nation. All of the aforementioned scales are guided by the international framework for water diplomacy.

Aided by previous research and definitions, **the following definition for multi-track water diplomacy was created to assist in the analysis**: “Water diplomacy is a process that provides means to prevent and mitigate water-related political tensions by making simultaneous use of water know-how and diplomatic tools and mechanisms. In this way, water diplomacy complements water cooperation through its focus on the ‘political’ and acknowledgement of the differing interests of relevant actors.” (6).

Previous studies on water diplomacy have focused on identifying potential hydro-political hotspots on a global scale (1, 66). As this study concentrated on regional and national contexts, a new scope was required to understand the current situation in the case study regions, with an emphasis on societal context (63). In order to satisfy relevant security, diplomacy and water aspects, the following three themes were chosen for a more detailed analysis of the current state of the case study regions:

- Society and politics
- Water and climate change
- Law and cooperative mechanisms

Futures research was also required to understand the implications of the current state analysis and effects of regional and global megatrends. Additionally, it can be used to identify starting points for regional or national tensions. While it is impossible to predict accurate future events, systematic futures research can provide relevant information for decision-making (80,86). A simplified scenario process was utilized in this analysis, which is studied in closer detail in the following chapter.

In order to identify possible water diplomacy actions, the scenario process was coupled with a study of the so-called water diplomacy toolkit, which includes different tools and mechanisms for water diplomacy. Water diplomacy is about applying diplomatic instruments together with technical ones used in water cooperation and transboundary water management (4). These instruments include negotiations, dispute-resolution mechanisms, the establishment of consultation platforms and the organization of joint fact-finding missions (4, 69). The concept of integrative diplomacy is crucial for the analysis as it highlights the different dimensions of modern diplomatic challenges and the need for collaborative relationships in solving these issues (45).

4.2 Using scenario thinking to recognize conflict paths

A simplified scenario process was utilized to create two **Conflict Paths** for both of the case study regions. The scenario process was inspired partly by the *multiple plausible futures* approach that creates alternative scenarios with the help of *predictive, explorative and normative methods* (80). These three methods can be linked to the three steps in the following manner:

- **predictive:** current state and megatrend analyses (*what will happen?*)
- **explorative:** Conflict Paths (*what could happen?*)
- **normative:** possible actions (*how can a specific target be met?*)

The *multiple plausible scenarios* method functions well for the purpose of this analytical framework, as the future in the regions during the timeframe is unclear and the probability of needing flexible solutions is high (80, 86). The *predictive* approach is built through common trends and “what if” scenarios, while in the *explorative* approach longer time frames and different angles are compared with the “what if” scenarios. The *Normative* approach was utilized in creation of the suggested measures of the report as it consists of steps or actions that are needed in order to meet objectives or desired futures.

Every conflict is unique and has its own context, which is why it would be impossible to effectively create multiple contingency plans with a single static approach (80, 87). This led to the decision to specifically create multiple undesirable Conflict Paths for this analysis in order to identify root causes of conflict in the case study regions and to recognise possible water diplomacy actions (87).

The logic of establishing the Conflict Paths and related water diplomacy actions is presented in Figure 8. In Conflict Path A, a conflict escalates through water-related tensions (i.e. water getting to politics), while in Conflict Path B the political tensions make water use political

(3). Similarly, water diplomacy actions are then either water-related i.e. linked to increased water understanding (A) or diplomacy-related i.e. utilisation of diplomatic tools and mechanisms also in water cooperation (B) (3). The timeframe of the conflict paths and actions is set to 2030 to provide long enough timeframe and also correspond with the deadline of the UN SDGs (19).

Together these actions form a possible water diplomacy strategy for the case study regions, which aims to bring the paths back towards peace and cooperation. As with the conflict paths, the possible actions are divided into two categories: measures that bring water related know-how to the political table (A) and measures that strengthen political cooperation and the use of diplomatic tools in water related cases (B). The proposed actions are mainly supporting or strengthening measures that build upon existing investments and projects, but they can also include completely novel ideas.

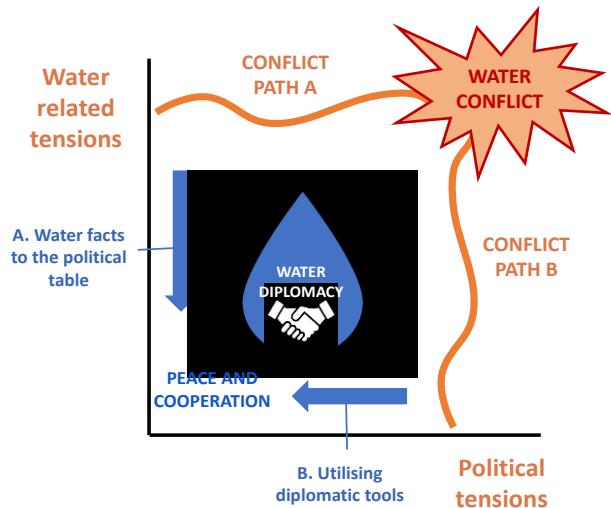


Figure 8: Creating Conflict Paths (6)

Concentrating on Conflict Paths instead of just general future paths provided the opportunity to assess water diplomacy potential for the regions, as potential disagreements and conflicts are the basis of the need for water diplomacy (4). The possible water diplomacy actions are formed by analysing the results from the current state and Conflict Paths. The aim of the actions is to be traceable to key points in the conflict paths, so that there is a clear connection to the root causes of the problems (87).

4.3 Analytical framework for water diplomacy

After identifying the three key steps: current state, conflict paths and possible actions, it was time to establish the analytical framework for water diplomacy. The main objectives of analytical frameworks, as identified by Cai (88), were used to steer the framework:

- i) Current state and conflict paths
→ Advances understanding
- ii) A systematic framework
→ Makes it easier to compare studies and possibly develop synergies between them
- iii) Possible actions
→ Help policy-makers and other practitioners to find and develop innovative solutions to challenges

The structure of the analytical framework is as follows (Figure 9): first the regions are investigated with a current state analysis (1st step), which is divided into three themes: society and politics, water and climate change as well as law and cooperative mechanisms. Through this analysis two possible Conflict Paths are created with a simplified scenario process and megatrend analysis (2nd step). Finally, the two Conflict Paths coupled with the current state and megatrend analyses are used to identify possible water diplomacy actions that can be used to prevent and mitigate potential conflicts (3rd step). Many of the methods used in this thesis (See Methodology section) became an integral part of the analytical framework.

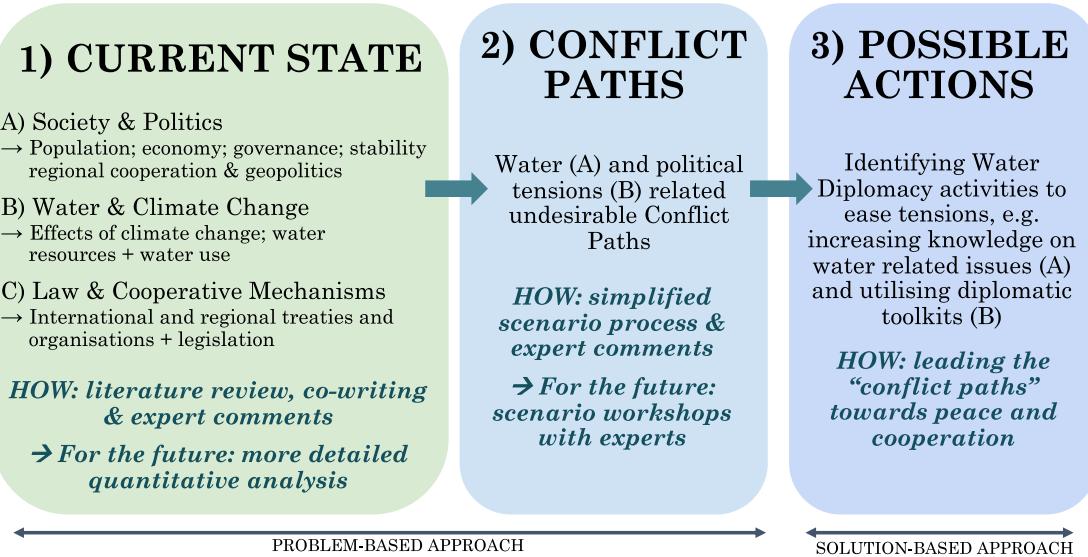


Figure 9: Analytical framework for water diplomacy

The current state and Conflict Paths represent a problem-based approach, while the possible actions step is an example of a solution-based approach (80). The methodology of each step is also explained in the above picture, including certain suggestion for the future, that could not be implemented due to time constraints. For example, in future analyses it would be beneficial to include local experts from the case study regions in the workshop process both for the analysis of the current state and the Conflict Paths. These suggestions are explored in greater detail in the Discussion section.

Different criteria, such as key components for water and post-conflict peacekeeping stated by Weinthal et al. (89) and summarized by Crawford et al. (90), were used to help identify the possible water diplomacy actions. These components include:

1. Involve stakeholders in decision making.
2. Prioritize, sequence, and coordinate water interventions.
3. Invest in resilient infrastructure and adaptive management.
4. Assess institutions and rebuild capacities for water governance.
5. Engage the informal sector.
6. Use water as a platform for cooperation and confidence building.

The final Conflict Paths and suggested water diplomacy actions were conceived with the case study analyses as they provided the needed regional and national context. It should be highlighted, that the recognized actions are indicative only as they provide just the authors' view building on the current state analysis and Conflict Paths.

4.4 Testing the analytical framework with case studies

The objective of the case study analysis was, firstly, to test the developed analytical framework, and secondly to identify opportunities for water diplomacy to advance proactive peace mediation in the chosen regions. The structure of the analyses is based on the analytical framework consisting of the following steps: current state, Conflict Paths and possible actions.

Two case study regions, Central Asia and Iraq, were chosen for the water diplomacy report commissioned by the MFA, which were also utilized in this thesis (6). Central Asia was chosen to represent a familiar context for Finnish foreign and development policy, while the Iraq case study represented an emerging context (90). Additionally, the Central Asia case study provided a regional context for the analysis, while the Iraq case study concentrated on a single state and its foreign relations.

The original case study analyses for the water diplomacy report were written together by four report authors, with the author of this thesis having the main responsibility for the analysis. The analytical framework was created together with senior lecturer Marko Keskinen from Aalto University while the legal analysis was written mainly by senior lecturer Tuula Honkonen and professor Antti Belinskij from UEF. Joseph Guillaume from Aalto University carried out the Water Scarcity Atlas future predictions. In this thesis the text on case studies has been translated from the Finnish language report and modified by the author to function with the focus of this thesis. Especially the section “Current state: law and cooperative mechanisms” still largely represents the text from the report by the aforementioned authors.

As the focus of this thesis is on the analytical framework itself rather than the case study results, only the Central Asia case study will be covered in full. The main findings from the Iraq case study can be found in Appendix I, while the discussion on its results can be found in the Discussion section.

5 Case Study: Central Asia

Central Asia is located on the crossroads of the ancient silk road and is in this study seen to consist of five former Soviet Socialist Republics: Kazakhstan, Kyrgyzstan (officially the Kyrgyz Republic), Tadzhikistan, Turkmenistan and Uzbekistan. The Soviet legacy is still strongly present in over-extraction of water for the sake of agriculture and gigantic infrastructure projects (91). Ethnic borders and environmental realities have been long disregarded leading to regional tensions and environmental catastrophes such as the drying of the Aral Sea (77, 91–93).

Dry climactic conditions are prevalent in Central Asia as scarce precipitation has highlighted the dependence on the two major regional rivers: Amu Darya and Syr Darya (77). Natural resources are divided very unevenly which has created and continues to create tensions (16). Regional water treaties and organisations are outdated or lacking in mandate.

The War in Afghanistan complicates the security situation in Central Asia (94). Additionally, several combatants have left the region to join extremist organisations such as the Islamic State of Iraq and Syria (ISIS) while international organisations continue to criticise the authoritarian and nationalist governments of human rights and freedom of speech violations as well as corruption (94, 95). Climate change is expected to increase glacial melting, create fluctuations in seasonal water flow as well as lead to stronger and more frequent extreme weather events (16, 77, 96).

Sustainable and equitable water use and pre-emptive water diplomacy are important tools for peace as the effects of population growth and climate change lead to wide-spread issues.

5.1 Current state

Society and politics

- The population of Central Asia is divided unevenly due to harsh climate conditions and uneven water availability. Fergana valley is the population center of the region.
- The economies are based on agriculture, industry and mining. Natural resources (especially fossil fuels) are unevenly distributed between downstream and upstream countries leading to economic disparities.
- All of the Central Asian countries have been classified as fragile. The security situation is aggravated by illegal drug trade, human trafficking, extremism and the nearby War in Afghanistan.
- Central Asia is located in a geopolitically important intersection, with differing interest from China, Russia and the USA. China's Belt and Road Initiative (BRI) has been of regional importance lately.

Central Asia is located in a geopolitically important intersection between Russia in the North, China in the East, Afghanistan and Iran in the South and the Caspian Sea and Europe in the West (Figure 10). Uzbekistan has the largest population (32.4 million) while Kazakhstan is the largest and most economically stable of the states. A majority of the population lives by the mountain ranges and in fertile river valleys while the great plains and deserts of Kazakhstan, Western Uzbekistan and Turkmenistan are scarcely populated. Fergana Valley,

situated between Uzbekistan, Tadzhikistan and Kyrgyzstan is the population centre of the region (97). Information on Central Asian states is shown in Table 1.

The population growth rate has been rising steadily in Central Asia since the latter half of the 20th century due to high birth rates and advancements in health care. In 1960 the population of the whole region was 24 million, when in 2017 it has already surpassed 71 million (98). The urbanization levels differ greatly between states, for example in Tadzhikistan it is only 25% while in Kazakhstan it is almost 60% (99). The five biggest ethnic groups are in descending order: Uzbeks, Kazakhs, Tajiks, Turkmen and Kyrgyz. All of the languages are Turkish in origin, except for Tajik, which is based on Persian. Islam is the prevalent religion with most of the population being Sunni Muslim.

Table 1: Information on Central Asian states (97)

State	Capital City	Population (2017)	Land area (km ²)
Kazakhstan	Astana	18 049 000	2 724 900
Kyrgyzstan	Bishkek	6 211 000	199 945
Tadzhikistan	Dushanbe	8 840 000	143 100
Turkmenistan	Ashgabat	5 503 000	491 210
Uzbekistan	Tashkent	32 422 000	447 400
Total		71 025 000	4 006 555

Since independence, Central Asian countries have chosen their individual pathways for economic development. Uzbekistan is focusing on a step by step transition into a market economy while Kazakhstan and Kyrgyzstan are attempting market reforms as foreign trade networks are lacking (100). Kazakhstan has the highest Gross Domestic Product (GDP) in the region (9030 USD per capita) while Tajikistan is still one of the poorest states in all of Asia (801 USD per capita) despite several attempts to diversify its economy (99). Turkmenistan is showing no interest in transforming to a market economy (100).

The economies of Central Asia are based on irrigation intensive agriculture, light and heavy industry and mining. During the Soviet era, the region provided most of the country's cotton and was an important producer of coal and other industrial minerals (101). Water intensive cotton production is still dominant, especially in Uzbekistan, where it constitutes around 10% of the country's exports (102). Fossil fuel take up the biggest share of exports in Kazakhstan and Turkmenistan (77).



Figure 10: Central Asia (16)

Income distribution in Central Asian states is quite equal according to the Gini coefficient (27–40; 27 in Finland). On the other hand, economic opportunities are much more restricted than in Europe and millions of workers have left the region to find higher paying work in countries such as Russia, Turkey and Korea (103). Salaries sent home by these workers are a major part of the GDP in some of the countries: 12% in Uzbekistan and 50% in Tajikistan (highest in the world) (104).

Energy security is a major cause of tension in the region, with downstream countries losing interest in selling their fuel and energy to upstream neighbours, when foreign energy companies are willing to pay more (77). For example, a trilateral energy treaty signed in 1998 broke down after just a year when Kazakhstan refused to deliver coal to Kyrgyzstan (105). The Kyrgyz government retaliated by cutting off the flow from its reservoirs (77). In 2009 Uzbekistan and Kazakhstan withdrew from the regional power grid leaving the upstream states in a catastrophic energy crisis in the middle of a harsh winter (106).

The governments of Central Asian states can be defined as authoritarian with the exception of Kyrgyzstan. Figure 11 showcases a map of resilience in a global study by Varis et al. (57) that combines three indexes: good governance, GDP and Human Development Index (HDI). Central Asia is coloured yellow in the map, which corresponds to below average resilience.

In recent years all of the Central Asian states have been classified as fragile based on the state's ability to govern their territory, offer public services and maintain legal institutions (107). Fragility has increased during the last decade. World Bank governance indicators place Central Asian states low on good governance indexes (Table 2) (16).

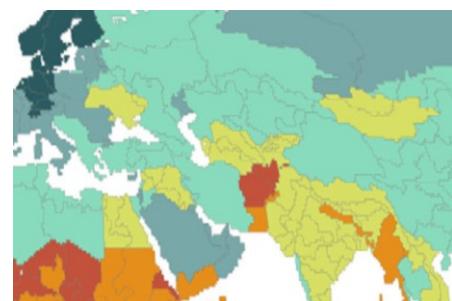


Figure 11: Resilience in Central Asia (57)

Table 2: Governance indicators (16, 108)

Governance Indicators (World Bank)	Political Stability (max. 100)	Government effectiveness (max. 100)	Rule of Law (max. 100)	Voice and Accountability (max. 100)	Corruption Perceptions Index 2018 (108)
Kazakhstan	45	54	38	14	124 / 180
Kyrgyzstan	30	23	17	33	132 / 180
Tajikistan	22	13	8	5	152 / 180
Turkmenistan	40	10	6	1	161 / 180
Uzbekistan	35	33	11	3	158 / 180

Regional cooperation has been hindered by individual states focusing on sustaining their political regimes and increasing nationalist sentiments (16). State leaders generally stay in power for life or name their own successors (104). Kyrgyzstan is the exception as revolutions in 2005 and 2010 have contributed to changes in the regime (109). Administrative institutions are centralised and inflexible while regional institutions are so weak that they cannot respond to tensions (77).

Since 2016, the situation has showed signs of improvement due to the inauguration of the liberal Uzbek president Shavkat Mirziyoyev. As a result, Uzbekistan has signed border treaties with Kyrgyzstan and Tajikistan and improved infrastructure between the states (110). Uzbekistan has also ceased to protest the proposed large hydropower projects in the upstream countries and even shown interest in economic cooperation (111). This development could have large-scale ramifications for the region as Uzbekistan is geographically central, sharing borders with all of the other countries in the region (77).

In March 2019 the long-standing president of Kazakhstan, Nursultan Nazarbayev announced his decision to step down (112). Critics note that his decision to relinquish power willingly during a time of public protests against his reign gives him the chance to continue to play a substantial role in the country's politics (112). In June 2019, the selected successor of Nazarbayev was elected amidst protests (113).

The critical regional threats in Central Asia are the War in Afghanistan, drug and human trafficking as well as the rise of extremist movements (16). Drug trafficking is closely linked with government corruption, while ISIS recruitment has led to an increase in human trafficking (92, 93, 114). Some militants have left the region to fight elsewhere but others have stayed and carried out attacks, such as in Aktobe, Kazakhstan in 2016 (95).

Due to its geopolitically important location, Central Asia has received special interest from major powers such as China, Russia and the USA. In the past, the security discussion centered on the War in Afghanistan but recently foreign nations have shown interest in the economic opportunities, natural resources (especially oil and gas) and strategic location (115).

Currently China is the most active in Central Asia through its Belt and Road Initiative (BRI) which aims to develop trade and infrastructure networks that connect Asia to Europe and Africa (116). China has invested heavily in the regions rail and road networks as well as energy production through bilateral treaties, which might lead to regional tensions if China decides to favour some states over others (117). Russia has a competing cooperative organization the Eurasian Economic Union (EEU), which has been joined by Kazakhstan and Kyrgyzstan while the USA aims to utilise its substantial economic assets to gain control of the regions natural resources (118).

The border between China and Kazakhstan is geopolitically interesting as a majority of the Kazakh water resources flow from China through the Ili and Irtysh rivers (77). Despite agricultural developments on both sides, cooperation has so far been productive which reflects on their dependence on each other: China is an important investor in the Kazakh energy sector while Kazakhstan is an important partner in China's BRI scheme (77, 119).

Water resources and climate change

- The Amu Darya and Syr Darya river basins contain 37% of the area and 80% of the population of Central Asia. There are numerous small but geopolitically meaningful rivers, which transcend national boundaries.
- Upstream countries have substantial hydropower potential. Dam projects and their effects are crucial to the stability and security of the region (e.g. Rogun Dam).
- Water intensive agriculture such as cotton production have led to the drying of the Aral Sea as well as extensive soil degradation and salinization.
- Due to climate change, the crucial glaciers of the region are in danger of melting, which could endanger water availability and food security throughout the region.

Central Asia is a vast geographically varied region which contains mountain ranges, deserts, grass plains, glaciers and fertile river valleys (96). Approximately 60% of the region consists of deserts, largest of which are the Karakum in Turkmenistan and the Kyzylkum in Western Uzbekistan. Irrigation from the major rivers of Amu Darya and Syr Darya make agriculture possible in large parts of the desert regions (77, 97).

Dry climatic conditions and erratic rainfall patterns are typical in Central Asia with most of the precipitation falling in Kyrgyzstan and Tajikistan. In the summer temperatures can rise to over 50 °C while in the winter they drop to under -45 °C (16). Uneven water distribution has led to large population centres being situated close to water as in Fergana Valley (97).

The largest water resources in the region are the Amu Darya (Afghanistan–Tajikistan–Turkmenistan–Uzbekistan) and Syr Darya (Kyrgyzstan–Tajikistan–Uzbekistan–Kazakhstan) Rivers (77). Amu Darya originates from the Pamir Mountains in Tajikistan and Syr Darya from the Tien Shan mountain range in Kyrgyzstan (77). Together their basin areas hold 90% of the region's river water, 80% of the population and 37% of the land area (77). Both of the rivers flowed into the Aral Sea before a large part of it dried up. Other important basin areas are the Balkhash-Alakol, Ob-Irtysh and Ural (Figure 13) (77).

In addition to the aforementioned large rivers, Central Asia is host to numerous small but important transboundary rivers especially in the Fergana Valley (16). Due to Soviet-era boundaries, the rivers and irrigation channels flow back and forth between Kyrgyzstan, Tajikistan and Uzbekistan creating tensions between different ethnic groups (16, 120). State boundaries have long been largely undefined in the region leading to further confusion and conflicts (16, 77).



Figure 12: Important basins in Central Asia (77)

Water is increasingly connected to the regional economy and politics due to its scarcity (77). In mountainous Kyrgyzstan and Tajikistan hydropower is a vital source of energy and an important export while in Uzbekistan and Turkmenistan water enables large-scale agriculture (77, 92, 93).

Cultivation of water intensive crops such as cotton and other agricultural products have made Central Asia one of the biggest water consumers in the world (Figure 14). According to the Food and Agriculture Organization (FAO) an area of approximately 100 000 km² is cultivated through irrigation (121). Turkmenistan currently holds the record for highest water use in the world per capita: 5952 m³/year.

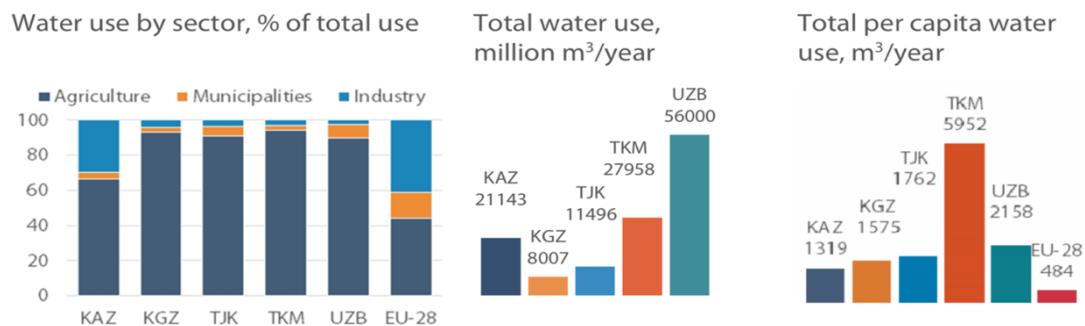


Figure 13: Water use in Central Asia (77)

The increasing agricultural demand is putting a heavy stress on water resources. According to the threshold set by the European Environment Agency, four of the five Central Asian states are water stressed (77). The most prominent example of water scarcity is the Aral Sea, which has changed from the fourth largest lake in the world to mostly salt flats in a few decades (91). Fishing villages and lakeside towns lost their coastlines and livelihoods as the growing salinity killed the majority of aquatic life (77). The regional climate has also hardened due to the loss of a large stabilising body of water (77, 91). In order to ease the situation, Kazakhstan has built a dam to contain the water flowing from Syr Darya in the northern remnants of the Aral Sea (122). Due to these efforts, water levels have increased, and commercial fishing has been resumed with the expense of increased hostility from Uzbekistan, who shares the lake (123). However, the water flowing into the lake is not nearly enough to restore it to its original volume (123).

The practice of diverting water from the major rivers for irrigation began during the Soviet era in the 1950s (77). The waters from Amu Darya and Syr Darya are extensively diverted as seen in Figure 15. When the irrigation water in the canals evaporates it leaves behind salt, which in time degrades the soil (77). This problem is aggravated by leaking irrigation channels, unsustainable water use and weak sewerage (77). In the Karakalpakstan region in Uzbekistan where the Amu Darya dries up to 95% of the land is salinized (124). Additionally, the surplus irrigation water flows back to the rivers carrying salt, fertilizer and toxins (77).



Figure 14: Irrigation channels in Central Asia (77)

In 2000, Turkmenistan published a grandiose project dubbed the Golden Age Lake, projected to cost 8 billion dollars (125). The objective of the project is to use the runoff water from irrigation to create a 100 km long artificial lake with an area of 2000 km² (125). The designers are hoping that the aquatic life in the lake will remove part of the salt so that the lake could function not only as a reservoir but as a source of water for surrounding areas. Scientists are sceptical about the feasibility of the project (77).

Energy resources are divided unevenly between the Central Asian nations (77). Kazakhstan, Uzbekistan and Turkmenistan have sufficient fossil fuel reserves to fulfil their own energy requirements while Kyrgyzstan and Tajikistan have to rely on hydropower and energy exports (77, 126). There is enormous scope and interest for additional production of hydropower as in 2018 Kyrgyzstan utilised only about 10% of its hydropower potential and Tajikistan 5% (127, 128). The interest to increase hydropower production is high as both of the states need more electricity especially during the harsh winters (77).

Proposed large-scale hydropower plants are expected to create tensions in the region due to their potential disruptions to water flow needed for agriculture in the downstream states (16, 77). Presently both the Amu Darya and Syr Darya are fed by melting glaciers with peak water flow during late spring and summer corresponding with the growing season (77). However, this cycle is endangered by the hydropower plans as their greatest need for energy is in the winter (126). Additionally, the filling of the reservoir dams takes years and has noticeable effects on the river flow. For example, the filling of the Rogun Dam, under construction in Tajikistan, is expected to lower the flow rate of the Amu Darya by 1.3% (129). Climate change is accelerating the melting of the glaciers, which could further escalate tensions (16).

Rogun Dam

Tajikistan began the construction of the Rogun dam in 2014. When completed it will be the highest dam in the world with a height of 335 m. The dam is located in close proximity to fault lines, but the World Bank has stated that this should not cause problems if the dam is built as planned. When completed the dam will generate 3 600 MW of electricity which constitutes 80% of the whole country's current capacity. However, the dam is not expected to be completed until 2028, after which it will take several years for the reservoir to fill.

Uzbekistan has been wary of upstream dam projects and their effects on agriculture. In 2012 the president of Uzbekistan Islam Karimov threatened Tajikistan with war if the Rogun dam project would continue. He denied access of construction equipment to the country for years as well as raising the cost and discontinuing gas exports to the upstream countries. In 2014 during one such interruption Tajikistan threatened to close a water canal leading to Uzbekistan. In 2016, the situation took a turn for the better as the new president of Uzbekistan, Shavkat Mirziyoyev declared his support for the Rogun project and even expressed interest in supporting it economically.

The Rogun dam reservoir will also have social and environmental effects. It will encompass an area of approximately 170 km² submerging 70 villages and forcing the relocation of about 42 000 people. On the other hand, the dam provides cheap energy to inhabitants which might save the nation's forests, which are being chopped extensively during winter. An estimated 70% of Tajik forests have disappeared due to logging, which has increased the threat of landslides.

The access to safe drinking water has increased considerably during the last decade, but many people, especially in Tajikistan, still lack access (77). The problems are prevalent in rural areas, but some bigger cities are also experiencing issues. Constructors aim to exploit groundwater resources as its quality is usually higher and availability more secure. Water utility construction and maintenance are generally neglected due to a lack of resources, with the rising amount of wastewater and soil degradation posing large challenges for the future (77).

During the last three decades the average temperature of Central Asia has risen by 0.5 °C and the rate is projected to increase in the following years (96). Glaciers are the primary source of water for the region's major rivers, but an estimated quarter of their glacial volume has already disappeared, and another quarter is expected to disappear by 2025 (126). Long-term effects include increased variability of water for the agricultural, human and energy needs (16). The World Bank estimates that with the current 1.5% growth rate, water availability will drop below 1700 m³ by 2050 and below 1000 m³ by 2080 (130). The report also estimates significant economic benefits from improving water use trends (77).

In addition to the temperature rise and glacial melting, extreme weather events such as droughts will become more common and precipitation patterns will change radically (96). The effects will be severe food security as agricultural productivity will suffer due to lowered water availability (16, 77). Energy demand will change with changing temperatures and storms will create problems for the already weak energy infrastructure (96).

Finland has supported Central Asian water resource management through the FinWaterWEI project (131). The objective is to strengthen water security in and around Kyrgyzstan and Tajikistan through equitable IWRM. The implementation phase has focused on developing water utilities and sanitation and establishing water committees in hard to reach regions (131).

Law and cooperative mechanisms

- Only a few of the Central Asian nations have signed international water treaties. Especially the upstream countries are wary of the treaties as they consider them biased.
- Several regional water treaties have been signed, but many of them are outdated declaration-like with no concrete results. Some mechanisms have proven to be functional.
- On a national level, the Kyrgyz water law considers water as an economic commodity, which means that other nations need to compensate for their share of water flowing downstream.
- There is a clear need for a trusted and efficient regional organisation which specialises on water cooperation and management.

International water treaties

Uzbekistan is the only Central Asian nation to sign the UN Water Convention. It remains very unlikely that the upstream countries of Kyrgyzstan and Tajikistan sign the treaty as they consider more favourable to their downstream counterparts (26, 30, 132). Kazakhstan, Turkmenistan and Uzbekistan have signed the UNECE convention. The countries which have not signed it are also actively participating in relevant workshops and events.

The UNECE convention on Environmental Impact Assessment (EIA) (1991 Espoo convention) and the associated proceedings on strategic EIA (2003 Kiev proceedings) are central to transboundary water cooperation. The Espoo convention has been signed by Kazakhstan and Kyrgyzstan, but the proceedings have not been signed by any Central Asian state. Additionally, several regional and bilateral water treaties include EIA obligations and in some the thresholds are even lower than in the UNECE convention (133).

Regional water treaties

Regional water treaties have created the foundations for Central Asian cooperation. From a legal perspective, these treaties are often simple and declaration-like, but have strengthened interstate relations and established cooperative mechanisms (134).

All of the five Central Asian states have signed the Almaty Agreement (1992) on cooperation in joint management, use and protection of interstate sources of water resources (135). The treaty contains decrees from international water law, such as the obligation not to cause significant harm, but omits others such as the principle of equitable use. The Almaty Agreement has been criticized for being merely an instrument for maintaining the Soviet era water treaties (136).

The agreement led to the establishment of the Interstate Commission for Water Coordination (ICWC). It was the first regional institution after independence with the aim of controlling regulation, ensuring efficient use and protection of the waters, developing a regional common water management policy and determining annual limits of water use for each state (135).

In 1993, the International Fund for Saving the Aral Sea (IFAS) was set up to generate funds for the Aral Sea and surrounding areas (135). The objective of IFAS is to ensure, that the scarce water resources of the Aral Sea basin are used in a sustainable manner and that the regions water quality is maintained at regulation levels. However these targets are not specified with concrete contractual obligations (136). ICWC was later integrated into IFAS.

A multilateral treaty concerning the coordinated water and energy use inside the Syr Darya basin was signed in 1998 by Kazakhstan, Kyrgyzstan and Uzbekistan (77). The signatory parties are committed to economic and reasonable water use in the region. In concrete terms the treaty stipulates that the excess energy generated in upstream countries during the growing season will be granted to the downstream countries which agree to give a corresponding amount of energy or a monetary compensation during the winter to the upstream countries (77). In practice the treaty has not functioned effectively (137, 138).

A general agreement on environmental protection to advance sustainable development in Central Asia was signed in 2006 and it has so far been ratified by Turkmenistan, Kyrgyzstan and Tajikistan (139). The agreement provides the legal framework for long-term cooperation regarding environmental themes such as water protection and sustainable use, but it will only step into force when Kazakhstan and Uzbekistan ratify it. The agreement could create a lasting foundation for cooperation through a permanent secretariat and regular meetings. This development could reflect beneficially on other cooperative mechanisms in the region.

Bilateral treaties and national law

Central Asian states have favoured bilateral treaties as instruments of regional cooperation for transboundary water resources management. In addition to this, the states have issued declarations that touch on shared water resources usually during presidential meetings. In March 2018, four Central Asian state leaders (Turkmenistan did not participate) met for the first time in years with water cooperation being high on the agenda. The presidents highlighted that regional water cooperation should be developed with regard to mutual benefits (140).

Turkmenistan and Uzbekistan have signed a bilateral treaty on cooperation over water management in 1996 (141). The treaty states that the water in Amu Darya is divided equally between the two countries.

The bilateral Chu-Talas River Commission was established in 2005 as part of a treaty signed by Kazakhstan and Kyrgyzstan. The commission consults, implements and regulates the maintenance and use of questions regarding water control infrastructure. The commission and related bilateral treaty are considered successful and a good example of upstream downstream cooperation to solve water conflicts.

A national law regarding regional water infrastructure use, water resources and water economy equipment was approved in Kyrgyzstan in 2001 (138). The law considers water as an economic commodity which if used by other states should be reimbursed financially. The law also allows Kyrgyzstan to cut the flow of water downstream (138).

Regional organisations

ICWC and IFAS have been responsible for joint management, use and protection of water resources since 1997. ICWC decides on regional water policy, composes and accepts annual water use quotas and monitors their compliance. IFAS has been working as a higher organisation for cooperation but it has been heavily criticised as being too weak to effectively coordinate IWRM (77, 142).

A lack of trust and dissatisfaction with the ICWC water quotas have been a regular mainstay in regional water cooperation (77). For example, Kyrgyzstan froze its participation to IFAS in 2016 as a protest to its proposed reforms falling through (138). Surprisingly, during the first IFAS summit in almost 10 years in 2018 state leaders expressed their interest to rein-vigorate cooperative and efficient water resources management (143). The summit proved that the Central Asian states are interested in raising the prominence of IFAS.

River basin organisations have been established for both Amu Darya and Syr Darya under the ICWC (144). These organisations take care of the several questions linked to the practical management of the rivers.

In addition, the following organisations are relevant IWRM actors in Central Asia:

- International Water Assessment Center (IWAC) is a relatively new institution, which has been working in Kazakhstan since 2017. Its objective is to support the implementation and application of the UNECE convention on transboundary waters in Central Asian states and beyond.
- UN Regional Centre for Preventive Diplomacy for Central Asia (UNRCCA) was established in 2007. Its mission is to identify and deal with existing and emerging threats to security in Central Asia.
- Regional Environmental Centre for Central Asia (CAREC) is a nonaligned international organisation, which supports Central Asian states in matters related to the environment and sustainable development. Water is one of the primary focus points.
- Interstate Commission for Sustainable Development (ICSD) aims to coordinate and monitor regional cooperation on environmental protection and sustainable development in Central Asia. Their work has connections to regional water management.
- Regional Water Partnership Network for the Countries of the Caucasus and Central Asia (GWP CACENA) has the primary objective of aid the states in solving difficult transboundary water related issues and help them develop IWRM in their policies and customs.
- Regional Network of Water (Basin) Organizations from Eastern Europe, Caucasus and Central Asia (EECCA WMO) is part of the International Network of Basin Organisations (INBO). EECCA WMO aims to support the exchange of information, knowledge and expertise and develop education and citizen participation on trans-boundary water management.

Summary

There is a strong need for more intensive cooperation in Central Asia. During the last years, the tendency has been that each state aims to solve their water resource problems unilaterally (16). This has led to the needs and interests of other basin countries being neglected (96). A notable example is the construction of the Rogun dam in Tajikistan, which has threatened to escalate into a conflict with Uzbekistan or the Kyrgyz national water law, which can be used by the state to approve of exacting tariffs on water use from other states (126, 138).

Central Asian states have created legal frameworks and cooperative mechanisms throughout the years but their potential in transboundary water management is not fully exploited. There are large differences in the participation, approval and investment on regional cooperation of the states, due to geopolitical emphasis and differing national priorities. High level regional water cooperation is happening largely on an ad-hoc basis and concentrates on short-term challenges and practical problems instead of a universal long-term strategy (137). Regular meetings between the states, clarification on the international legal system and international aid are needed to improve the situation.

Due to the strong politicization of water issues, Central Asian water cooperation is becoming a field for diplomats and foreign ministries (136). Additionally the need to defend national interests instead of integrated solutions has been highlighted with transboundary water management being centered around bilateral state-centric decision-making (136). A notable issue is the neglection of international water principles and best practices (145). This is explained in some cases by the treaties being instruments of their time, when the aforementioned principles were not as strong and universally acknowledged as today. It should be noted however, that at least some of the international principles have been incorporated in many regional treaties.

5.2 Conflict Paths

Formulating the Conflict Paths for the case study areas built on the analysis of current state, complemented with relevant key trends and drivers. The logic of establishing the Conflict Paths and related water diplomacy actions is presented in Figure 15. In Conflict Path A, water conflicts escalate through water-related tensions (i.e. water mixing with politics), while in Conflict Path B the political tensions lead to water use becoming political (3). Similarly, water diplomacy actions are then either water-related (A) or political and diplomatic (B) (3).

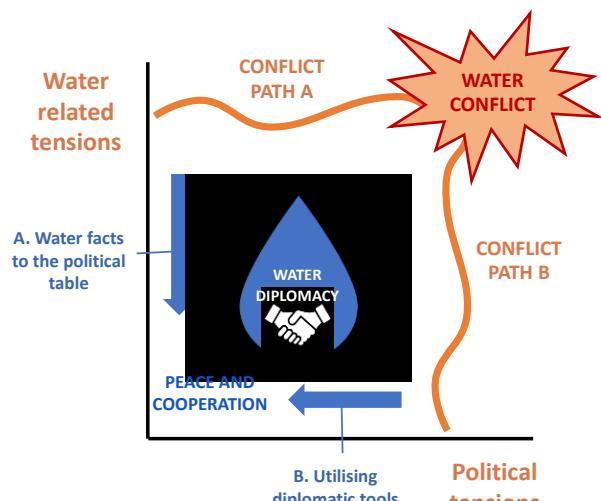


Figure 15: Creating Conflict Paths

Climate change is possibly the most relevant future driver in Central Asia as its impacts are expected to be severe. Dry periods are estimated to become longer, seasonal rainfall more erratic, extreme weather events more frequent and the mean temperature in the whole region will rise (96). The average temperature of Central Asia has risen by 0.5 °C during the last three decades and is expected to rise between 2.0 °C to 5.7 °C by 2085 (96). The glaciers will be affected most, while seasonal water fluctuations will have a detrimental effect on

agriculture in the downstream countries (77, 126). Droughts and desertification are already significant problems and their effects will only grow more severe in the future (16, 77). Table 3 showcases the most pressing dangers of climate change in Central Asia (96).

Table 3: The effects of climate change in Central Asia

Effects on Water Resources	Effects on Agriculture	Effects on Energy sources
Glacial melting: changes in seasonal water availability	Variations in seasonal water availability	Changes in seasonal energy demand
Reduced availability of drinking water and irrigation water	Lowered crop yields: danger to food security	Lowered reliability and production of hydropower
More frequent land and mud slides	Increased salinification and desertification of land	Storm damage in energy infrastructure

The current population of Central Asia is around 73 million, and it is growing at an annual rate of 1.4%: projected population in the area will thus be around 82 million in 2030 and 94 million in 2050 (98). The growth is significant when taking into account the uneven population density in the region. In 2019, 39.1% of the people lived in cities, which is expected to rise to 41.5% in 2030 and 49.2% in 2050 (98).

Future water scarcity was investigated with the Water Scarcity Atlas, designed at Aalto University (for more information, see Chapter 3 Methodology). In Figure 16 we show water stress (the percentage of available water used) according to three socio-economic scenarios and two levels of crop yield improvement (13). Using a high percentage of available water (even 20%) means that it becomes more difficult to access the resource sustainably. Water users need to handle conflict or cooperation, as well as handling increasing costs of accessing water and environmental impacts.

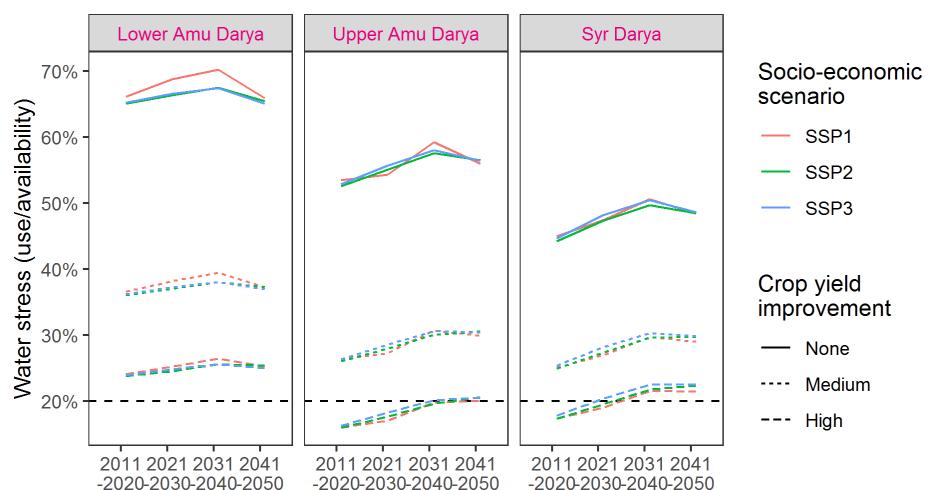


Figure 16: Water stress predictions in the Amu Darya and Syr Darya (13)

The socio-economic scenarios include changes in domestic and industrial water use quantified by IIASA's Water Futures and Solutions program based on the Shared Socio-economic Pathways, developed by the Intergovernmental Panel on Climate Change (IPCC) (82, 83).

The scenarios respectively corresponding to “Sustainability”, “Middle of the road” and “Regional rivalry”. Irrigation areas are kept constant, but irrigation water use takes into account climate change projections. The effect of crop yield improvements assumes that water use can be scaled down if productivity is improved, as examined by Kummu et al. (146).

Figure 16 shows that crop yield improvements are key for the future of Central Asia. If there are no changes in agricultural methods, all of the inspected regions (Amu Darya & Syr Darya) are clearly over the set 20% boundary for water stress. Even with medium changes, the population living under water stress is significantly lower. There are some uncertainties about the effect of future socio-economic development on domestic and industrial water use and therefore water stress. In general, however, there is substantial potential for improvement in water productivity that would potentially allow water to be freed up for other uses. Water is allocated within basins proportionally to river flows, so water sharing agreements may also change the situation.

Conflict Path A: Shared waters in a changing climate

Conflict Path A is based on water related tensions. Three critical aspects for the region were identified: the effects of climate change to water resources, the unsustainable water use trends in agriculture and large-scale hydropower projects in upstream countries.

Central Asia is at its heart a dry region, which has been cultivated thanks to a massive network of canals (77). Decades of unsustainable water use especially in agriculture has taken its toll on the region’s largest rivers, Amu Darya and Syr Darya, which both feed the dried-up Aral Sea (77). The relative returns from water in Central Asia are lower than anywhere in the world (91). Glacial melting and changes in seasonal water availability was already mentioned in the previous chapter, but this scenario concentrates also specifically on the Fergana valley, where numerous smaller streams and canals transcend national boundaries (77, 120).

The effects of large hydropower projects especially on seasonal water availability is a growing concern for downstream countries due to the implications on food security (77, 126). Neighbouring hydropower projects can be an easy target for blame when water runs out.

Conflict Path B: Lack of cooperation takes center stage

Conflict Path B is based on tensions related to geopolitics and regional cooperation. In this conflict path the standout theme is a lack of a regional water cooperation organization.

Central Asian nations have recently expressed their interest in regional cooperation, but a lack of trust and dissatisfaction with earlier institutions make it difficult (77). As climate change makes access to basic needs more difficult, the possibility of regional shifts, such as ones seen during the Arab Spring are not out of the question (91). Similarly, to the Middle East, changes in fossil fuel prices (especially oil) can have a detrimental effect on the economies of downstream countries (77).

The interests of great powers such as China and Russia are difficult to predict. China has invested huge amounts of money in national infrastructure and energy networks through BRI, while Russia has a strong historical influence and a military presence in the region (116).

The created Conflict Paths (A and B) are showcased in Figure 17. As stated before, they represent coherent and believable (but not necessarily most likely) descriptions of the future.

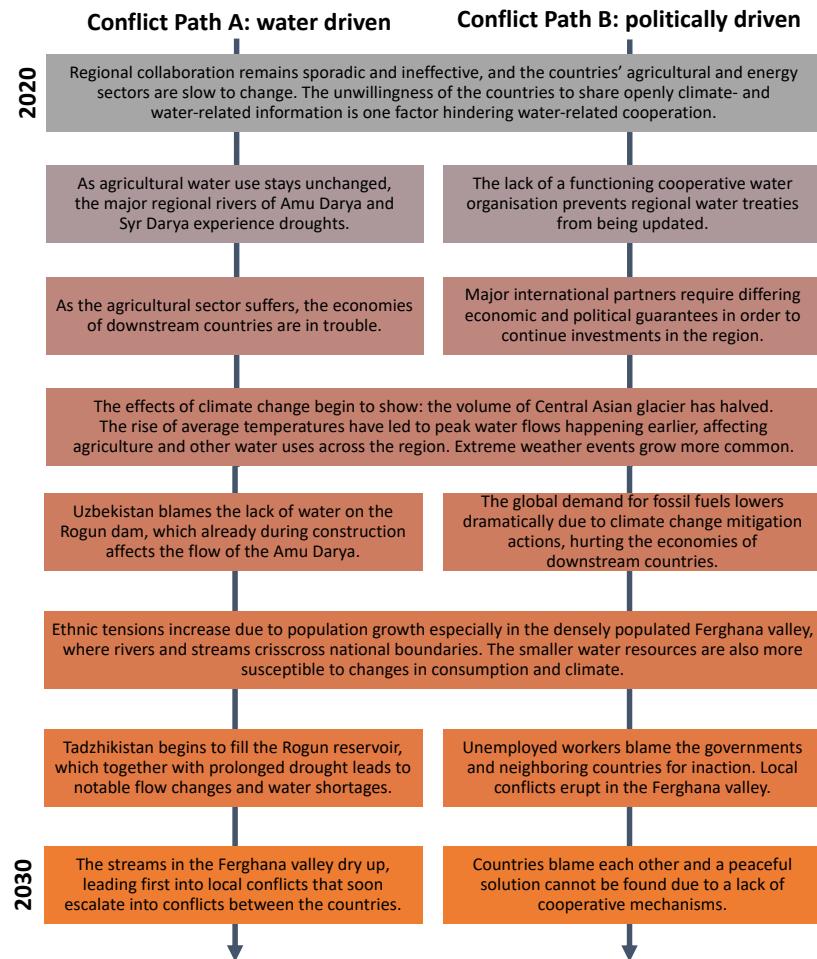


Figure 17: Conflict Paths in Central Asia

In addition to the conflict paths, several so called “wild card” (low-probability, high-impact) scenarios were identified for further study. These include terrorist attacks, power vacuums after long-term leadership changes and environmental catastrophes.

5.3 Possible water diplomacy actions

The third and final step in the analytical framework is the recognition of possible water diplomacy actions. In accordance with the Conflict Paths, the actions are also divided into water-related actions (A) as well as into policy- and diplomacy-related actions (B), and they build partly on already on-going activities in the region. It must be noted, however, that the recognised actions are indicative only, as they provide just the authors' view building on the current state analysis and the defined Conflict Paths. In an actual water diplomacy analysis, recognition of such actions should be done in close collaboration with key international, regional and national actors working on the region.

- **Open access to climate change-related data (A):** Climate change related data in the Central Asian countries is currently not entirely open due to national security concerns (16). Given the importance of climate change as key driver for water management in the region, a neutral and open database for detailed climate change data -including its estimated impacts to water resources- could enhance understanding of water-related pressures in the region.
- **Revitalising and revising regional water treaties (A):** While Central Asia has some existing water treaties, they are partly outdated and/or not functioning very well (134). Current treaties also focus on only certain aspects of water use and management, such as regulating water use for agricultural needs. As a longer-term water diplomacy action, it would therefore be crucial that existing water treaties and institutions are first of all revitalised i.e. returned to use and also revised so that they take the different water uses and users equally into consideration, building on the general principles provided by international water conventions. The upstream countries are yet to sign the UNECE convention or UNWC, which should be brought up as cornerstones for regional cooperation.
- **Improved water efficiency (A):** Agriculture in Central Asia is water intensive, meaning that improvements in water efficiency could bring benefits to the entire region, including both bigger and smaller transboundary water bodies. This process can be supported by international partners, including Finland and the EU.
- **Joint regional organisation for natural disaster forecasting and relief (B):** One possible way forward in terms of more general regional cooperation would be the establishment of a joint regional organisation for disaster forecasting and relief. This could be beneficial for local populations, particularly in the highly populated Fergana valley, and could thus enhance collaboration both at local and national scales.
- **Enhanced economic cooperation (B):** Central Asian countries have a remarkable potential to diversify their economies and enhance their economic cooperation in the region due to the populations' relatively high education level, remarkable natural resources and important geopolitical situation (91).

6 Discussion

The quality and reliability of the established analytical framework (primary objective of the thesis) is analysed in this discussion section. The section is divided into two parts: a methodological discussion on the analytical framework and a context-based discussion on case study results.

6.1 Methodological discussion on the analytical framework

Methodologically there are three main findings for this study: i) the establishment of an analytical framework for water diplomacy, ii) the creation of Conflict Paths based on a basic scenario process and iii) the results from testing the analytical framework with case studies. All these three finding are next discussed briefly.

Analytical framework

The main objective of an analytical framework is to structure thinking in order for an analysis to have tangible outcomes. According to Cai (88), analytical frameworks can contribute to research in three ways, of which the first two are: i) by advancing our understanding and ii) by making it easier to compare studies and possibly develop synergies between them.

The established analytical framework succeeds in both of these steps. Firstly, a clear strength of the framework is that it brings a novel approach to the study of water conflicts by concentrating on the core focus of water diplomacy: disagreements and disputes (4). Additionally, the analytical approach answers the suggestion by Farinosi et al. (66) that further concentration in water diplomacy analyses should be put into regional or sub-regional contexts and specific transnational river basins, where rapid population growth, climate change and unsustainable development are key factors in future research.

The clear structure of the analytical framework should make it easy to use the framework also in other regions and thus compare the results. However, further regional and sub-regional analyses are needed to prove this hypothesis. The scope of the current state analysis is narrow, but sufficient enough in providing the needed context for any region with potential for water diplomacy actions.

Despite the noted issues it can be concluded that the established framework contains the key elements for a water diplomacy analytical framework. It brings together water cooperation as well as diplomacy and security while providing a foundation for future water diplomacy analysis.

Conflict Paths

The third way that analytical frameworks can contribute to research is by helping policy-makers and other practitioners to find and develop innovative solutions to challenges (88). In the analytical framework, this was accomplished through region-specific Conflict Paths, that were based on a simple scenario process. The paths were then studied to identify the roots of the problems, to which potential water diplomacy actions were created. As Doucey (87) states: “understanding the root causes of conflict and its psychological dimension is crucial for sustainable peace building”.

The undesirable Conflict Paths proved to be a useful tool in identifying at least some of the roots of the water-related tensions in the case study regions. A novelty of the scenario process was its concentration on solely undesired outcomes in order to identify as many starting points for possible tensions as possible (147). These starting points were then used as foundations for the water diplomacy actions. In this way, the Conflict Paths helped in discovering connections between water cooperation and diplomacy as well as raising awareness on possible threats.

Water diplomacy is a truly multi-disciplinary field and the added knowledge of experts in fields such as politics, peace and conflict studies or anthropology could provide valuable input to similar studies in the future (18, 70). This study also omitted research into the actor networks in the case study regions, as the objectives were centered on building Finnish water diplomacy capacity. A thorough actor network analysis on a local, regional and international level could provide valuable insight into science-policy interactions, which are often lacking in similar analyses (18, 46).

Case studies

Our findings regarding the analytical framework are supported by the results from the case study analyses. The case studies proved that the framework can be used to meaningfully investigate regions and individual states and form a clear picture of their current state. The aforementioned Conflict Paths formed the basis of suggested water diplomacy actions for the case study regions.

The decision to choose two case study regions instead of one proved to be the right one, as it created the possibility to compare the case studies through identified similarities and differences. A major motivation for the decision was the possibility of gathering more compelling evidence and improving the robustness of the analysis (85).

It would be interesting to recreate the analysis on different regions to find out if the same similarities could be identified and used in finding areas that could benefit from water diplomacy measures. These characteristics could provide a valuable addition to studies that rely heavily on quantitative analysis and help in understanding the phenomena and mechanisms behind water conflicts, as suggested by Farinosi et al. (66).

Limitations

Due to the vast amount of available literature coupled with time and resource constraints it was necessary to limit the scope of the analysis to ensure its effectiveness. However, this did create some limitations for this study.

First of all, the accuracy of the current state analysis in the case study areas can be debated, as the author lacked comprehensive knowledge of the regions. Although this was remedied partly through the expert interviews, a more inclusive study with potentially local experts would be needed in the future, especially as time constraints limited the number of interviews and workshops. There are also some issues related to the reliability of the results, as the research articles were studied only in English and Finnish, leaving a wide gap of knowledge especially regarding the case study regions.

Secondly, creating the Conflict Paths was not without uncertainties and problems either. Again, accuracy proved to be a core problem, as many parts of the Conflict Paths can be seen to lack robust arguments and are instead based on the authors own views and interpretations. Additionally, the perspective on the current state analysis and creation of the conflict paths was heavily Finnish, as the water diplomacy report was compiled for the MFA of Finland in Finnish. On the other hand, according to the IPCC, scenarios only need to be *internally consistent and plausible* (79), but not necessarily the most probable outcomes. This gave the author a sufficient level of freedom required to create effective Conflict Paths.

Final and rather major limitation was the lack of time, which meant that the whole water diplomacy analysis was carried out by a few researchers, yet it is clear that a proper water diplomacy analysis would benefit from a broader involvement of international experts through for example workshops regarding the Conflict Paths as well as more detailed quantitative future research. Such further studies are clearly needed.

6.2 Discussion on case study results

The similarity between the two case studies of Central Asia (Chapter 5) and Iraq (Appendix I) is striking. Both are characterized by a strong upstream-downstream imbalance regarding natural resources. Possibly the most notable similarity is the shared lack of regular dialogue and cooperative organizations, which usually form the backbone of water diplomacy. The situation in Iraq is critical as there is currently no active water cooperation between it and upstream Turkey, while in Central Asia there are cooperative mechanisms, but they are outdated and lack mandate.

In general, a more precise investigation into the local circumstances is needed in order to identify the actors, institutions and interactions as well as verify the collective problem, that has led to the creation of social norms (148). As Hufty (148) states, all societies develop their own way of decision-making and conflict resolution, which needs to be charted before trying to implement water diplomacy measures. The fact is, that these complex networks cannot be comprehensively studied without on-site knowledge.

A similar study was carried out by Huntjens et al. (14) issued by the Hague Institute of Global Justice, in which a multi-track water diplomacy framework was established and tested. The study has a similar objective of creating practical solutions for water diplomacy by identifying benefit-sharing across sectors. Due to the novelty of the study, the results from the case studies in the Brahmaputra and Jordan basins could not yet be compared. However, this could provide an interesting study opportunity for the future.

Discussion on the Central Asia case study

The results from the case study of Central Asia indicate that historical internal and regional tensions over water still reflect on the current state. The main finding regarding water diplomacy measures was the need to strengthen regional dialogue and establish a trusted organization for water resources cooperation.

The suggested water diplomacy measures were sorted in order of rising difficulty, with the idea of beginning with the first steps of cooperation, such as sharing climate change related knowledge and establishing a joint disaster forecasting, prevention and aid system. These cooperative steps could in turn lead to updated regional water treaties and the establishment

of a trusted organization for water cooperation. Foreign development aid could focus in introducing new less water intensive crops and support in diversifying the economies as also suggested by Varis (91).

Finnish actors in Central Asia were contacted in order to gain a wider understanding of the situation in the region. However, to be certain of the need and effectiveness of the measures, further research is needed. A clear limitation of the analysis is the lack of a study on the local actors and their interests. Such an investigation could prove indispensable to carry out the suggested water diplomacy measures with local help. Reed et al. (149) identifies possible methods, such as interest-influence matrices, actor networks and rainbow diagrams, which could be very useful for such an analysis. The conflict-cooperation matrix, developed by Mirumachi (150) could also prove useful in studying the development of conflicts and their mechanisms.

Discussion on the Iraq case study

There is a clear lesson learned from the Iraq case study regarding the different levels of water diplomacy and their connections. By concentrating on an individual state, the internal situation could be studied more thoroughly than in the case of Central Asia. On the other hand, the scope of the study had to be expanded to neighbouring countries due to the transboundary nature of the countries water resources.

Due to the complex nature of the current state of Iraq, it should be noted that all of the levels of water diplomacy (regional, transboundary, bilateral and national) have a significant role in furthering proactive peace mediation. In fact, all of the obstacles for successful water cooperation identified by Genderen and Rood (17) are present in Iraq.

In the Spring of 2019, the Turkish president Tayyip Erdogan announced that he expects the filling of the Ilisu reservoir to begin in the summer, which could lead to severe water shortages downstream, highlighting the urgency of the situation (151). The foremost water diplomacy measure for the nation is to establish regional water cooperation mechanisms, such as river basin organization with Turkey, as stated in the possible actions. These steps could in turn mitigate the general hostile situation in the region.

The future of Iraq regarding climate change, security, politics and economy is challenging. Iraq is completely reliant on transboundary waters from upstream countries, but water cooperation is practically non-existent due to recent conflicts and a lack of trust between the countries. Based on our analysis, there is a clear need for water diplomacy in Iraq, but implementing the stated measures is easier said than done. Challenges and obstacles are abundant while resources are scarce and future international actions may be required.

7 Conclusions

Water diplomacy is a relatively novel topic, which is why previous research has focused on large entities on a global scale. Therefore, the primary objective of this thesis was to establish an analytical framework for more detailed scale (i.e. regional and national) water diplomacy analysis with the help of scenario thinking. Finally, the functionality of the framework was studied with two case studies: Central Asia and Iraq.

To help with the primary objective, the following **Research Questions** were identified:

- How to define water diplomacy?
- What are the key elements of an analytical framework for water diplomacy?
- How scenario thinking can help to recognize potential for water diplomacy actions?

The findings of the analysis show that the Research Questions were closely interlinked. Defining water diplomacy proved crucial in identifying the key elements for the analytical framework, such as the Conflict Paths. The following definition for multi-track water diplomacy was identified: “Water diplomacy is a process that provides means to prevent and mitigate water-related political tensions by making simultaneous use of water know-how and diplomatic tools and mechanisms. In this way, water diplomacy complements water cooperation through its focus on the ‘political’ and acknowledgement of the differing interests of relevant actors.” (6).

The identification of different scales of water diplomacy focused the study to regional level for the Central Asia case study, and to national / bilateral level for the Iraq case study. Scenario thinking was then used to create undesired Conflict Paths for both case study regions. This proved instrumental in identifying possible roots for conflict, which then functioned as the foundation for possible water diplomacy actions. The process proved to be simple yet effective and well suited for the scope of this analysis.

After developing the Conflict Paths, the analytical framework was established with the identified key elements. The three-step framework was structured in the following manner: analysis of the current state (1st step), two Conflict Paths (2nd step) and finally possible water diplomacy actions, that could be used to mitigate and resolve water-related tensions and conflicts (3rd step).

The framework was then utilized in the analysis of the case study regions, with positive results. The decision to choose two case study regions proved to be the right choice as it created the possibility to compare the two regions and gave robustness and credibility to the analysis. As mentioned in the Discussion section, there are limitations and opportunities for development, which is why the author hopes that the established analytical framework will be updated in the future.

This master’s thesis continued the work of the MFA project “Vesidiplomattia - ennakoivaa rauhanvälitystoimintaa” (Water Diplomacy - Proactive Peace Mediation) (6). As such, it helped move Finland’s national water diplomacy agenda forward and possibly on to gaining institutional recognition on a global scale. As a result of the project, a Finnish water diplomacy network was created, which aims to strategically bring together ministries and relevant stakeholders to advance peaceful and sustainable development globally.

The need for water diplomacy policy and actions is highlighted in the Council of the EU conclusions from 2018. They state that “the Council intends to enhance EU diplomatic engagement about water as a tool for peace, security and stability, and firmly condemns the use of water as a weapon of war (44). The Council also underlines the EU’s commitment to “promoting transboundary and integrated water management as well as effective water governance” (5).

The findings of this thesis provide a viable analytical framework for regional and national water diplomacy analysis, that can be used anywhere in the world. The approach is particularly suited for developing countries or regions where climate change, rapid population growth and societal context are key factors. The analytical framework can also be used to support Finland’s international water strategy or larger schemes, such as the ones stated by the Council of the EU (152).

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Appendix 1: Main Findings from the Iraq Case Study

Iraq is situated in the area historically known as the Fertile Crescent between and around the Euphrates and Tigris rivers, surrounded by Iran, Jordan, Kuwait, Saudi Arabia, Syria and Turkey (153). In recent years, the security situation in Iraq and the surrounding region has been aggravated by the terrorist organisation ISIS, which at the height of its power controlled over a third of the country (154). Currently, stability in the region is undermined by escalated tensions between the USA and Iran (155). The emergence of ISIS is interconnected to various societal, economic and environmental security threats that are all aggravated by climate change (153). The population of Iraq is growing with an alarming rate, while economically the country is extremely dependent on fluctuating oil prices (98, 156). Climate change is a major concern, with diminished agricultural livelihoods and complete dependency on foreign water sources already causing tensions (153, 154).

Current state

Society and politics

- The population of Iraq is 39 million people (2017) with the median age being approximately 20 years and annual population growth rate 3% (98). The population is centered around the Euphrates and Tigris rivers, with 70% of people living in urban areas (98).
- Iraq is an Islamic society with the two dominant branches, Shia and Sunni, more equally represented than in any other state. Iraq has historic tensions with its neighbour Iran due to past conflicts and religious differences (155). Recent friendlier relations have soured due to US troops still stationed in Iraq (157).
- There is a notable Kurdish population living in the northern province of Kurdistan. The Syrian refugee crisis has led to an estimated 250 000 registered refugees and countless unregistered more to be stranded in the region (99).
- The economy of Iraqi economy is extremely dependent on its large oil reserves and oil exports (90% of national income) (154, 156). Agriculture constitutes only 5% of GDP but 25% of national livelihoods (154).

Water resources and climate change

- Iraq is completely dependent on the water resources of its neighbours, namely Turkey, Iran and Syria (153, 154, 158). Both of Iraq's major rivers, the Euphrates and Tigris, originate from Turkey (158, 159).
- Iraqi water security is highly vulnerable to the effects of climate change, agriculture and upstream dam projects. In 2018, Turkey completed the construction of the Ilisu dam on the Tigris with the filling of the reservoir expected to begin in 2019 (151). This could lower water flow to Iraq by up to 60% (159).
- Climate change is expected to have severe impacts on Iraq, such as increased annual temperatures, extreme weather events and a decrease in annual rainfall (153). This will lead to more water shortages and food insecurity (153, 154).
- Iraq lacks a national water management plan and does not have funds to execute its water resource strategy (154).

Law and cooperative mechanisms

- Iraq has signed the UNWC in 2001 and is on the verge of signing the UNECE water convention (160). Many of the principles of the treaties are already binding as customary law norms.
- Iraq has only signed bilateral treaties regarding its transboundary waters due to differing views on the legal status of the Euphrates and Tigris (68). The treaties do not cover the overall management of the rivers.
- The Iraqi constitution states that the state should take care of transboundary water resources and ensure their availability (161). A national water law is in the draft stage but has not been completed due to the difficult internal situation.
- There is a clear need for enhanced regional cooperation as there are currently no active RBOs for the Euphrates or Tigris (68).

Conflict Paths

The second step of the water diplomacy analysis was formulating the Conflict Paths. The logic of establishing the Conflict Paths and related water diplomacy actions is presented in Figure 18. In Conflict Path A, water conflicts escalate through water-related tensions (i.e. water mixing with politics), while in Conflict Path B the political tensions lead to water use becoming political (3). Similarly, water diplomacy actions are then either water-related (A) or political and diplomatic (B) (3).

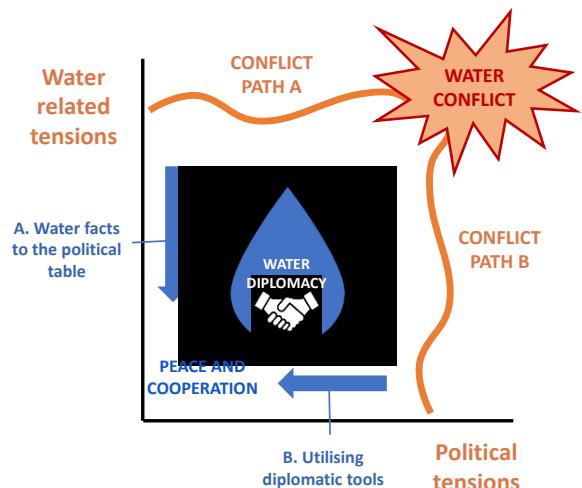


Figure 18: Creating Conflict Paths

Climate change is a major future driver in relation to water in Iraq. It is estimated that precipitation will decrease by 9%, while the average temperature will rise by 2 °C by 2050 (154). Heat waves, sand storms and desertification will increase, with dire consequences on water resources and food security (153).

Future water scarcity was analysed with the Water Scarcity Atlas, designed at Aalto University (13). The findings showed that by improving the water efficiency of agricultural methods, it is possible to substantially decrease the percentage of population living in water scarce areas (Figure 19).

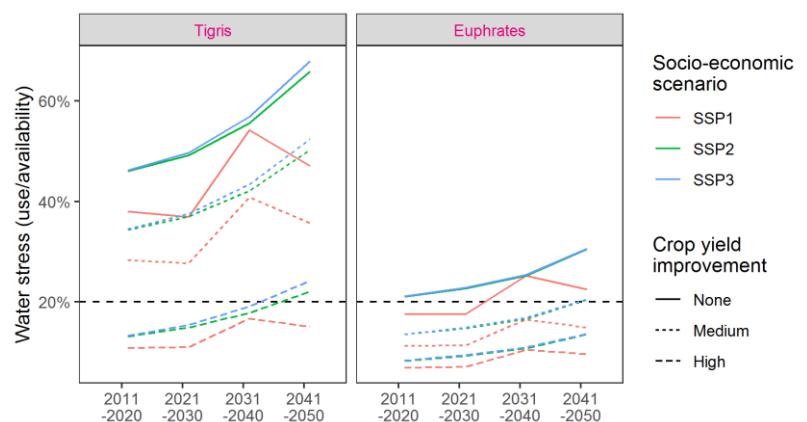


Figure 19: Future water stress in the Tigris and Euphrates Basins (13)

According to UN Population Division, the population of Iraq is expected to reach 53 million people by 2030 and over 81 million people by 2050) (98). Urbanisation in Iraq is at 70% very high and might further increase due to climate change and stressors.

The key elements of Conflict Paths for Iraq are illustrated in Figure 20. Building on our analytical framework, the two paths were built through water-related tensions (A) and political tensions related to geopolitics and a lack of regional cooperation (B). The timeframe for both Conflict Paths is until 2030, with climate change being a major source of tension.

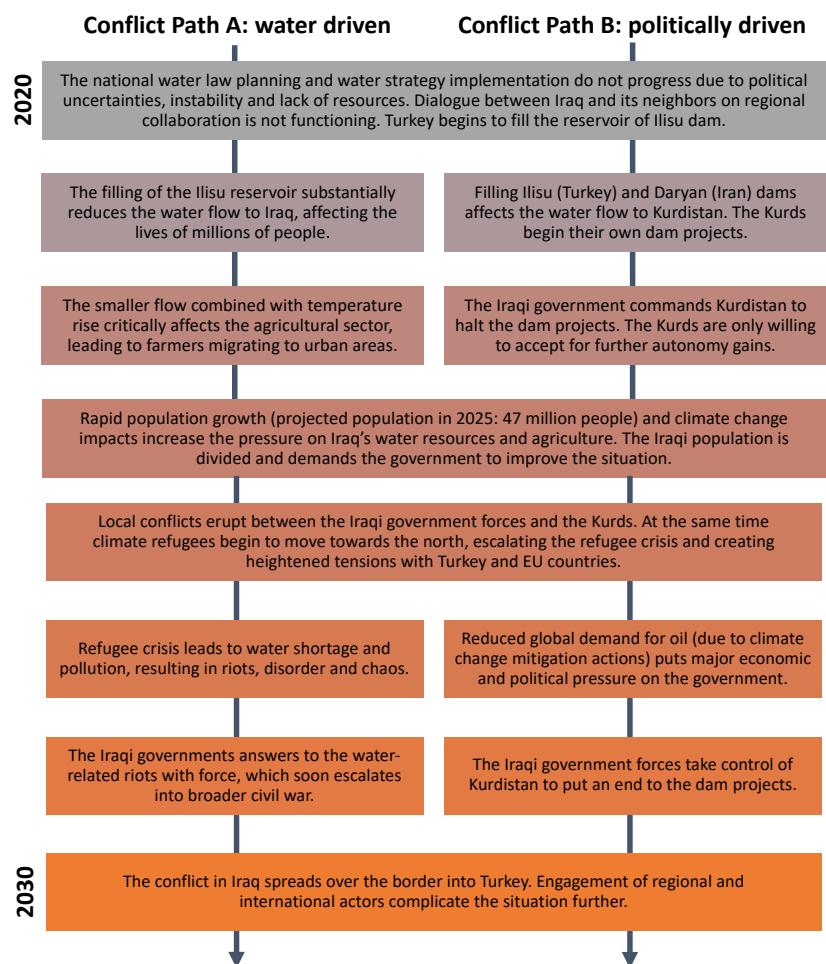


Figure 20: Conflict Paths in Iraq

In addition to the conflict paths, several so called “wild card” (low-probability, high-impact) scenarios were identified for further study. These include the effects of single extreme weather events such as prolonged droughts, the emergence of new or existing terrorist organisations and escalating regional tensions especially between the USA and Iran.

Possible water diplomacy actions

The third and final step in the analytical framework is the recognition of possible water diplomacy actions. In accordance with the Conflict Paths, the actions are also divided into water-related actions (A) as well as into policy- and diplomacy-related actions (B), and they build partly on already on-going activities in the region. It must be noted, however, that the recognised actions are indicative only, as they provide just the authors’ view building on the current state analysis and the defined Conflict Paths. In actual water diplomacy analysis, recognition of such actions should be done in close collaboration with key international, regional and national actors working on the region.

- **Monitoring climate-related risks (A):** Climate change will have severe effects on the water resources of Iraq and the whole region (153, 154). As a result, a systematic and open database for climate change and its estimated impacts would benefit water resources management both nationally and regionally.

- **Enhancing active water cooperation through dialogue (A):** Establishing active water cooperation between Iraq and its neighbours can be seen as a priority in terms of water cooperation and water diplomacy. A possible first step could be the introduction of RBOs either independently or as a part of a larger regional cooperation mechanism. International actors could support dialogue between the countries as well as provide technical support for the organisations (154).
- **Capacity building through scenarios (B):** Failing infrastructure, outdated agricultural practices, political instability, corruption and climate change all need long term solutions (154, 158). One way to build understanding and capacity to respond to these major challenges could be a multisectoral scenario process.
- **Revising national water and climate policy (B):** The population living in water scarce areas in Iraq is expected to double by 2050 (158). The Iraqi government aims to search for new groundwater sources and improve current infrastructure, but this requires firm policies as well as financial and technical support (154, 158). One practical step forward would be the establish a revised water and climate policy for Iraq, considering economic, social and environmental implications of water-related plans.